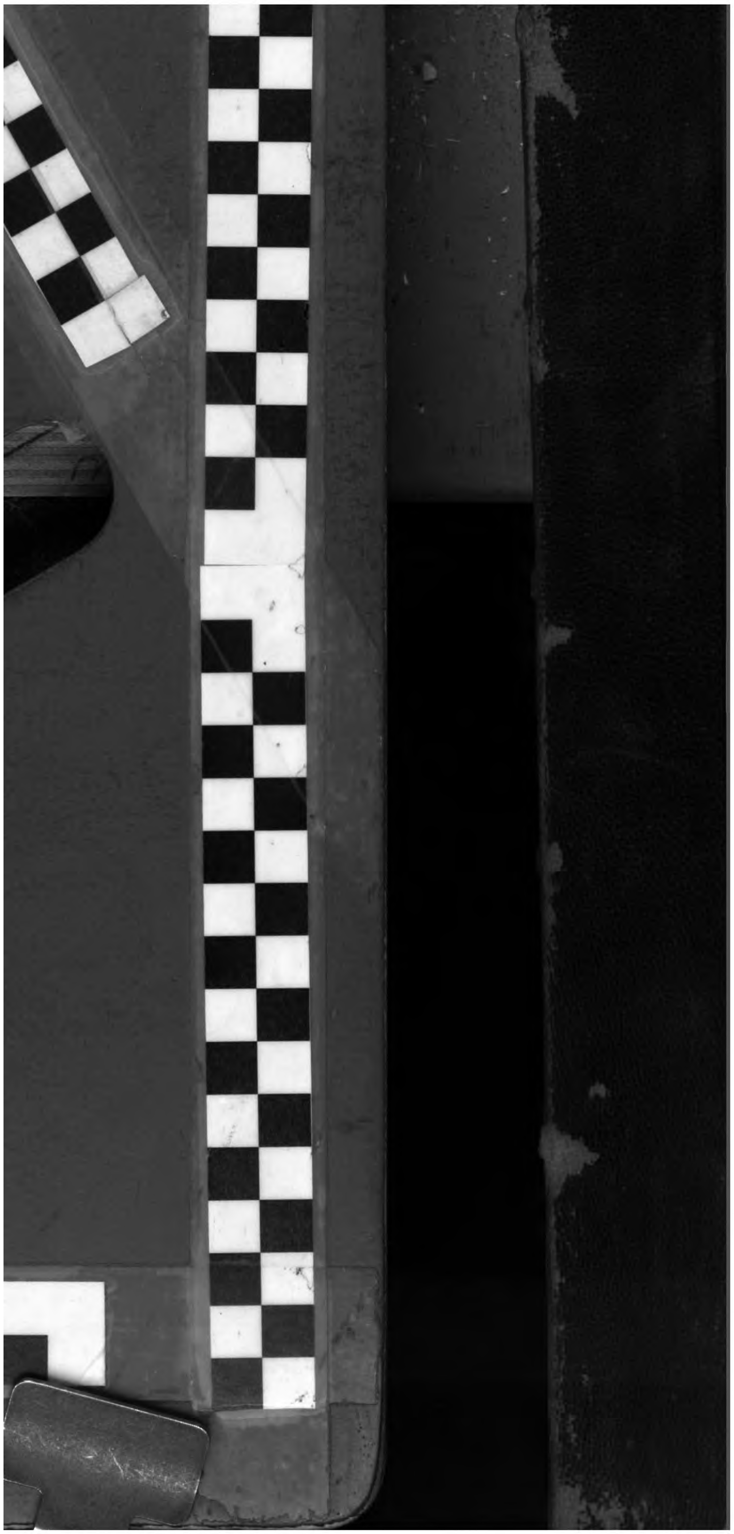
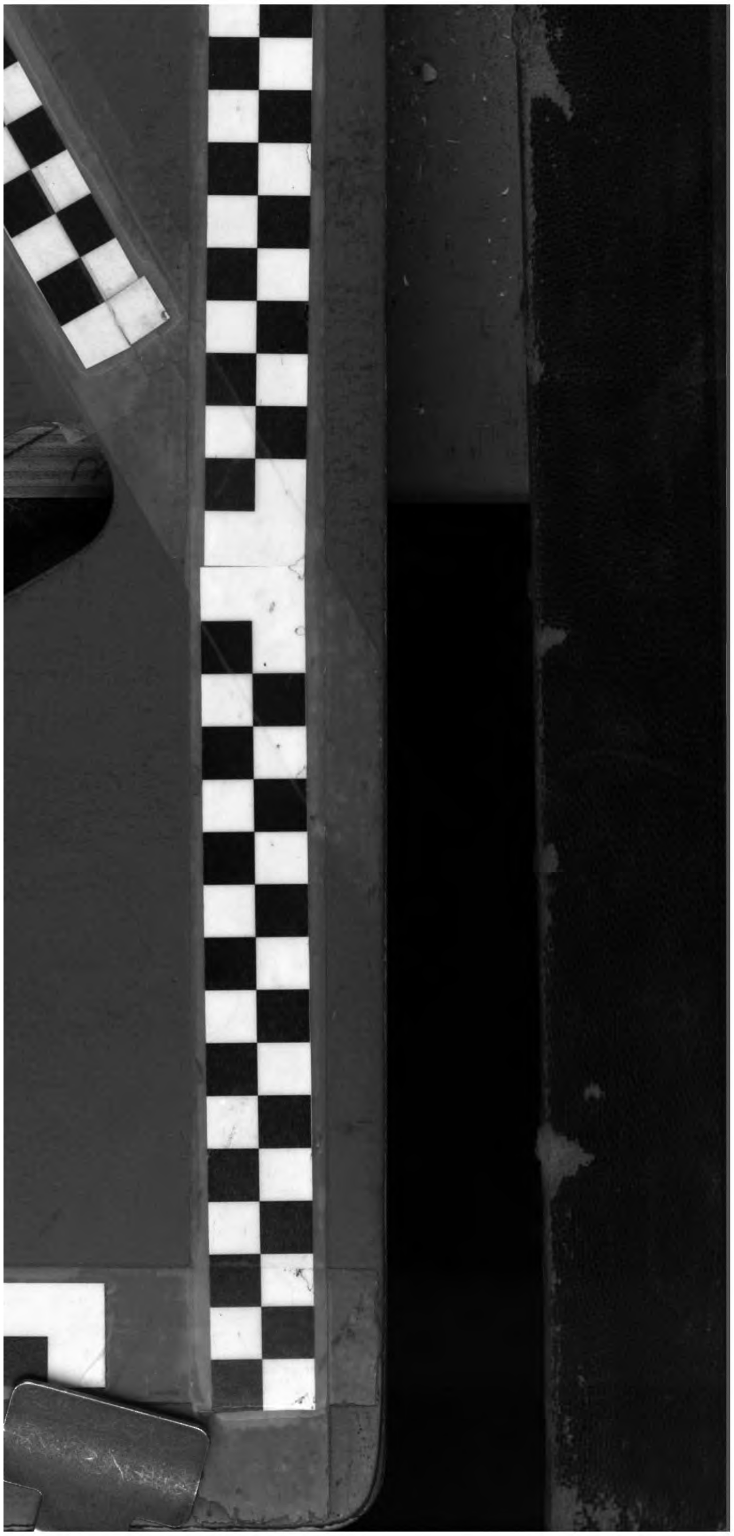
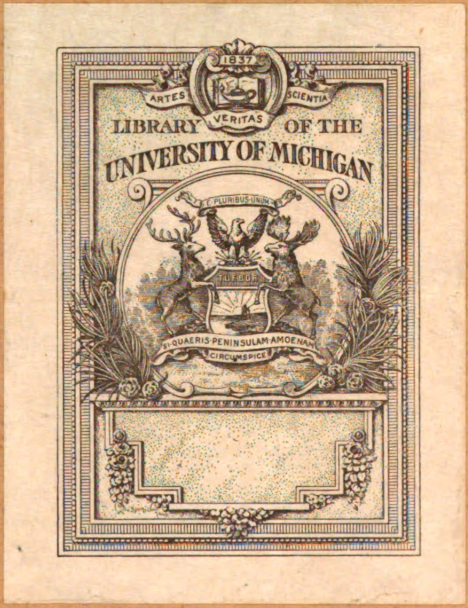
Building age.

New York, David Willaims company [etc.]

http://hdl.handle.net/2027/mdp.39015080123543






1837
ARTES
VERITAS
SCIENTIA
LIBRARY OF THE
UNIVERSITY OF MICHIGAN
E PLURIBUS UNUM
TUEBOR
SI QUAERIS PENINSULAM AMOENAM
CIRCUMSPICE

CARPENTRY AND BUILDING

VOL. XXVIII.—1906.

NEW YORK:
DAVID WILLIAMS COMPANY,
14-16 PARK PLACE.

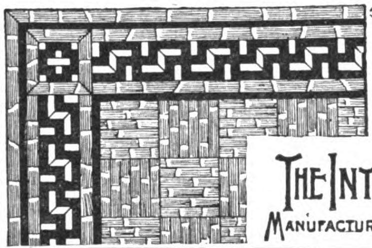
INDEX.

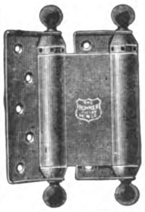
Carpentry and Building

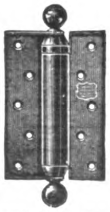
WITH WHICH IS INCORPORATED

The Builders' Exchange

Vol. XXVIII. No. 1. New York, January, 1906. Ten Cents a Copy. One Dollar a Year.







Alphabetical List of Advertisers.

American Column Co.	58
American Rolling Mill Co.	9
American School of Correspondence	11
American Wood Working Machinery Co	4
Asphalt Ready Roofing Co.	1
Atkins, E. C. & Co	66
Baker McMillen Co	62
Barnes, W. F. & John Co	5
Barnes Tool Co	7
Co	1
Batavia Clamp Co	63
Berger Mfg. Co	8
Bommer Bros	1
Boston Bolt Co	12
Bostrom-Brady Mfg. Co	66
Boynton Furnace Co	16
Braunsdorf-Mueller Co	63
Bridgeport Chain Co	68
Broad Gauge Iron Stall Wks	62
Burlington Venetian Blind Co.	68
Burnham, Hitchings, Pierson Co	11
Burritt, A. W. Co	60
Cabot, Samuel	1
Caldwell Mfg. Co	60
Canton Steel Roofing Co	11
Champion Safety Lock Co	62
Chattanooga Roofing & Fdy. Co.	53
Chicago House Wrecking Co.	3
Cincinnati Tool Co	63
Cleveland Stone Co	9
Columbia Mineral Wool Co.	16
Comstock, Wm. T	68
Cordesman, Meyer & Co.	8
Cortright Metal Rfg. Co	15
Crescent Machine Co	7
Danforth, A. H	6
Davis & Cook	62
Diamond Expansion Bolt Co	7
Disston, Henry & Sons	66
Dixon, Jos., Crucible Co	67
Drouve, G. Co	9
Duby & Shinn	63
Eastern Granite Roofing Co	3
Edwards Mfg. Co	8
Eller, J. H. & Co	13
Energy Elevator Co	15
Fay, J. A. & Egan Co	6
Floyd, Wells Co	61
Ford Auger Bit Co	68
Forest City Bit & Tool Co	62
Foster Munger Co	58
Fox Machine Co	7
French, Samuel H. & Co	15
Frink, I. P	68
Gage Tool Co	16
Gayle, T. D	63
Gem Publishing Co	6
Globe Ventilator Co	15
Goodell Mfg. Co	63
Grand Rapids Hdw. Co	58
Grand Rapids Wood Carving Co	59
Hamlin, George R	11
Hammacher, Schlemmer & Co.	53
Hartmann Bros. Mfg. Co	60
Hess Warming & Ventilating Co.	61
Hubbard, D. S., Son & Co	59
Ideal Concrete Machinery Co	69
Interior Hardwood Co	1
International Cor. Schools	7
International Heater Co	61
Ives, Hobart B. & Co	58
Jennings, C. E. Co	68
Johnson, E. J & Co	12
Kanneberg Rfg. & Ceil. Co	11
Karol, B. C	6
Kees, F. D	15
Keighley, S. Metal Ceiling & Mfg. Co	12
Kelsey Heating Co	16
Kidder, R. E	8
Kimball Bros. Co	15
King Mfg. Co	59
Kinnear & Gager Co	13
Kraeuter & Co	63
Lane Bros. Co	59
Leavitt Machine Co	63
Lestershire Lumber & Box Co	62
Long Island Machinery Co	8
Lorenzen, Chas. F. & Co	60
Mallory Mfg. Co	67
March-Brownback Stove Co	61
Marston, J. M. & Co	6
Mesker & Bro	14
Mietz, A	15
Miller, A. W., Mfg. Co	16
Millers Falls Co	68
Montross Metal Shingle Co	8
Morton, Thomas	58
Mullins, W. H. Co	12
National Mfg. Co	59
National Saw Co	66
Nat'l Sheet Metal Rfg. Co	14
New Jersey Zinc Co	14
N. Y. Steel Corner Plate Co.	14
Nicholls Mfg. Co	63&67
North Bros. Mfg. Co	67
O. K. Harry Steel Wks	12
Ostendorf, W H	58
Ostrander, W. R. & Co	67
Parker Wire Goods Co	67
Parks Ball Bearing Machinery Co.	8
Pettyjohn Co	9
Phila. & Boston Face Brick Co.	16
Pike Mfg. Co	1
Progressive Mfg. Co	63
Raymond Lead Co	59
Rich, J. & G	67
Sackmann, F. A	6
Samson Cordage Works	68
Schafer Furnace Co	61
Schaller-Hoerr Co	59
Scott & Co	6&10
Sedgwick Mch. Works	15
Seneca Falls Mfg. Co	5
Shimer, Samuel J. & Sons	7
Silver Lake Co	68
Simonds Mfg. Co	16
Smith, Otis A	67
Smith & Egge Mfg. Co	62
Standard Paint Co	8
Stanley Rule & Level Co	67
Stanley Works	1
Star Encaustic Tile Co	8
Starrett, L. S. Co	1&68
Stetson, R. O	68
Stowell Mfg. Co	9
Streilinger, C. A. Co	63
Taintor Mfg. Co	68
Topp, G. A. & Co	11
Tower & Lyon	63
Truss Metal Lath Co	15
Tubular Heating & Ventilating Co	61
Union Mfg. Co	62
U. S. Mineral Wool Co	16
Van Dorn Iron Wks. Co	7
Waddell Mfg. Co	58
Walters, Wm. P. Sons	67
Warner Elevator Mfg. Co	15
Washburne, E. G. & Co	7
Wheeling Corrugating Co	10
White, Van Glahn & Co	68
Wilkinson, A. J. & Co	67
Willis Mfg. Co	12
Woodhouse Hdw. Mfg. Co	66
Wood-Mosaic Flooring Co	16
Woods, A. W	59

Classified List of Advertisers.

Air Compressors
Mietz, A.

Annunciators
Ostrander, W. R. & Co.

Architects' Details
Lestershire Lumber & Box Co.

Asbestos
Stowell Mfg. Co.

Auger Bits
Ford Auger Bit Co.
Jennings, C. E. Co.

Awnings
Chattanooga Roofing & Fdry. Co.
O. K. Harry Steel Works

Band Saws
American Wood Working Machinery Co.
Cordesman, Meyer & Co.
Crescent Machine Co.
Fay, J. A. & Egan Co.

Barrel Swings
Leavitt Machine Co.

Bath Fittings
Chicago House Wrecking Co.

Blackboards, Slate
Johnson, E. J. & Co.

Blinds
Burlington Venetian Blind Co.
Foster-Munger Co.
Schaller-Hoerr Co.

Blind Hinges
Parker Wire Goods Co.
Stanley Works

Bolts and Nuts
Boston Bolt Co.

Books
Arthur, Wm.
Comstock, Wm. T.
Gem Publishing Co.

Boring Machines
Fox Machine Co.
Millers Falls Co.

Brackets, Building, Folding
Danforth, A. H.

Builders' Hardware
Boston Bolt Co.
Hammacher, Schlemmer & Co.

Building Brackets, Folding
Danforth, A. H.
Stanley Works
Tower & Lyon Co.

Building Material
Lestershire Lumber & Box Co.

Building Paper and Felt
Cabot, Samuel.
Standard Paint Co.

Builders' Supplies
Schaller-Hoerr Co.

Butts and Hinges
Stanley Works.

Capitals
Grand Rapids Wood Carving Co.
Waddell Mfg. Co.

Ceiling, Metallic
Berger Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Edwards Mfg. Co.
Eller, J. H. & Co.
Kanneberg Roofing & Ceiling Co.
Keighley, S. Metal Ceiling & Mfg. Co.
Kinnear & Gager Co.
Wheeling Corrugating Co.
Willis Mfg. Co.

Cement
French, S. H. & Co.

Cisterns, Steel
O. K. Harry Steel Works.

Clamps
Batavia Clamp Co.
Cincinnati Tool Co.

Concrete Block Machines, Portable
Ideal Concrete Machinery Co.
Pettyjohn Co.

Conductor Pipes
American Rolling Mill.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.

Conservatories
Burnham, Hitchings, Pierson Co.

Contractors' Supplies
Boston Bolt Co.

Cornices, Sheet Metal
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Edwards Mfg. Co.
Eller, J. H. & Co.
Kanneberg Roofing & Ceiling Co.
Mesker & Bro.
Mullins, W. H. Co.
Willis Mfg. Co.

Cresting
Van Dorn Iron Works Co.
Willis Mfg. Co.

Cutter Heads
Shimer, Sam'l J. & Sons.

Designs and Details
(See House Plans)

Door Checks and Springs
Hammacher, Schlemmer & Co.

Door Hangers
Lane Bros. Co.
National Mfg. Co.

Draw Knives
Wilkinson, A. J. & Co.

Drawing Instruction
International Correspondence Schools.

Drawing Outfits
Comstock, Wm. T.
Rich, J. & G.

Drying Stoves
Drouve, G. Co.

Dumb Waiter Fixtures
Hammacher, Schlemmer & Co.

Dynamos
Mietz, A.

Eave Troughs
Chattanooga Roofing & Fdry. Co.
Eller, J. H. & Co.
Wheeling Corrugating Co.

Elevators and Dumb Waiters
Energy Elevator Co.
Kimball Bros. Co.
Sedgwick Machine Works.
Warner Elevator Mfg. Co.

Engines
Mietz, A.

Expansion Bolts
Boston Bolt Co.
Diamond Expansion Bolt Co.

Fencing
O. K. Harry Steel Works.

Files and Rasps
Barnet, G. & H. Co.
Boston Bolt Co:

Framing Tools
Topp, G. A., & Co.

Furnaces and Heaters
Boynton Furnace Co.
Floyd-Wells Co.
Hess Warming & Ventilating Co.
International Heater Co.
Kelsey Heating Co.
March-Brownback Stove Co.
Schafer Furnace Co.
Tubular Heating & Ventilating Co.

Gas and Electric Fixtures
Frink, I. P.

Gas Machines
International Heater Co.

Grates, Fancy Plated
Chattanooga Roofing & Fdry. Co.

Greenhouses
Burnham, Hitchings, Pierson Co.

Grille Work, Wood
Foster-Munger Co.
Waddell Mfg. Co.

Grindstones
Cleveland Stone Co.

Grooving Heads
Fox Machine Co.

Hardware Jobbers
White, Van Glahn & Co.

Hardware Specialties
Champion Safety Lock Co.

Hasps, Hooks and Staples
Woodhouse Hdw. Mfg. Co.

Heaters.—*Steam and Hot Water.*
Burnham, Hitchings, Pierson Co.
International Heater Co.

Hinges, Spring
Bommer Bros.

Hinges, Window Screen.
Kees, F. D.

Hoists
Mietz, A.

House Plans
Comstock, Wm. T.

Iron House Fronts
Mesker & Bro.

Iron Work
Van Dorn Iron Works Co.

Lath, Metal
Truss Metal Lath Co.
Wheeling Corrugating Co.

Lavatories
Chicago House Wrecking Co.

Levels
Baker, McMillen Co.
Bostrom-Brady Mfg. Co.
Davis & Cook.
Stetson, R. O.

Lightning Rods
Washburn, E. G. & Co.

Lumber and Shingles
Lestershire Lumber & Box Co.

Mangers, Slow Feed
Broad Gauge Iron Stall Works.

Mantels
Burritt, A. W., Co.
Foster-Munger Co.
French, Sam'l H. & Co.
Lorenzen, C. F. & Co.
Ostendorf, W. H.
Phila. & Boston Face Brick Co.

Marine Engines
Mietz, A.

Masons' Stoves
Drouve, G. Co.

Metal Lath
Truss Metal Lath Co.

Mill Work
Schaller-Hoerr Co.

Mineral Wool
Columbia Mineral Wool Co.
U. S. Mineral Wool Co.

Miter Boxes
Braunsdorf-Mueller Co.
Goodell Mfg. Co.
Nicholls Mfg. Co.

Miter Machines
Fox Machine Co.

Moldings
American Column Co.
Grand Rapids Wood Carving Co.
Schaller-Hoerr Co.
Waddell Mfg. Co.

Mortar Colors
French, Sam'l H. & Co.

Mortisers Hand
Miller, A. W., Mfg. Co.

Ornamental Sheet Metal Work
Mullins, W. H. Co.

Paint
New Jersey Zinc Co.
Standard Paint Co.

Parquette Flooring
Interior Hardwood Co.
Wood-Mosaic Flooring Co.

Patent Lawyers
Hamlin, George R.

Pencils
Dixon, Jos. Crucible Co.

Planes
Gage Tool Co.
Smith, Otis A.
Tower & Lyon Co.
Union Mfg. Co.

Plasterers' Corner Plates
New York Steel Corner Plate. Co.

Plastic Ornaments
French, Samuel H. & Co.

Plumbers' Supplies
Karol, B. C.

Porch Columns
American Column Co.
Hartman Bros. Mfg. Co.

Pumps
Mietz, A.

Reflectors
Frink, I. P.

Roofing, Art Metal Tile
Mullins, W. H. Co.

Roofing and Siding
Asphalt Ready Roofing Co.
Berger Mfg. Co.
Canton Steel Roofing Co.
Drouve, G. Co.
Eastern Granite Roofing Co.
Edwards Mfg. Co.
Eller, J. H. & Co.
Kanneberg Roofing & Ceiling Co.
Lincoln Waterproof Cloth Co.
O. K. Harry Steel Works.
Scott & Co.
Standard Paint Co.
Stowell Mfg. Co.
Wheeling Corrugating Co.

Roofing Brackets
Stanley Rule & Level Co.

Roofing Paint
Asphalt Ready Roofing Co.
Dixon, Jos. Crucible Co.

Roofing Slate
Johnson, E. J. & Co.

Sash Balances
Caldwell Mfg. Co.

Sash Chains
Bridgeport Chain Co.
Morton, Thomas.
Smith & Egge Mfg. Co.

Sash Cord
Samson Cordage Works.
Silver Lake Co.

Sash Locks
Champion Safety Lock Co.
Hubbard, D. S., Son & Co.
Ives, H. B. & Co.

Sash Operating Devices
Burnham, Hitchings, Pierson Co.

Sash Pulleys
Grand Rapids Hardware Co.

Sash Weights
Raymond Lead Co.

Sashes, Doors and Blinds
Foster-Munger Co.
Lestershire Lumber & Box Co.

Saw Clamps
Disston, Henry & Sons.

Saw Filing Guide
Disston, Henry & Sons.

Saw Holders
Gayle, T. D.

Saw Jointers
Crescent Machine Co.

Saw Sets
Taintor Mfg. Co.

Saw Tables
Crescent Machine Co.
Kidder, R. E.

Saws
Atkins, E. C. & Co.
Disston, Henry & Sons.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
National Saw Co.
Simonds Mfg. Co.

Schools
American School of Correspondence.
International Correspondence Schools.

Screw Drivers
Kraeuter & Co.
North Bros. Mfg. Co.

Sheet Metal Fronts
Mesker & Bro.

Shingles and Tiles, Metallic
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Cortright Metal Roofing Co.
Montross Metal Shingle Co.
National Sheet Metal Roofing Co.
Willis Mfg. Co.

Shingles Hip
Wheeling Corrugating Co.

Shingle Stains
Cabot, Samuel.

Shutter Worker
Mallory Mfg. Co.

Shutters (See Blinds)

Skylights
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Drouve, G. Co.
Edwards Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mullins, W. H. Co.
Willis Mfg. Co.

Speaking Tubes
Ostrander, W. R. & Co.

Spring Hinges
Bommer Bros.

Squares
Duby & Shinn.
Nicholls Mfg. Co.

Steel Figures and Letters
Sackman, F. A.

Steel Square Key
Woods, Alfred W.

Stoves and Ranges
Boynton Furnace Co.

Structural Iron and Stee Works
Boston Bolt Co.

Structural Slate
Johnson, E. J. & Co.

Tanks, Steel
O. K. Harry Steel Works.

Tiling
Ostendorf, W. H.
Star Encaustic Tile Co.

Tool Boxes
Walter's Sons, W. P.

Tool Cabinets
Hammacher, Schlemmer & Co

Tool Chests
Jennings, C. E. Co.

Tools
Forest City Bit & Tool Co.
Gage Tool Co.
Hammacher, Schlemmer & Co
Jennings, C. E. Co.
Kraeuter & Co.
Millers Falls Co.
North Bros. Mfg. Co.
Progressive Mfg. Co.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S., Co.
Strelinger, C. A., Co.
Tower & Lyon Co.
Walter's Sons, Wm. P.
Wilkinson, A. J., & Co.

Turned, Molded Carved Work
Waddell Mfg. Co.

Ventilating Attachment
Drouve, G., Co.

Ventilators
Globe Ventilator Co.

Veranda Stock
American Column Co.

Vises
Hammacher, Schlemmer & Co

Wagon Jacks
Batavia Clamp Co.

Water Closets
Chicago House Wrecking Co.

Weather Strips
Hammacher, Schlemmer & Co
King Mfg. Co.

Weather Vanes
Broad Gauge Iron Stall Works.

Window Apparatus
Drouve, G. Co.

Window and Door Stops
King Mfg. Co.

Window Fasteners
Stanley Works.

Window Stop Adjusters
Ives, Hobart B., & Co.

Window Trimmings
Caldwell Mfg. Co.

Windows, Fireproof
Mullins, W. H. Co.

Wood Carving
Grand Rapids Wood Carving Co.

Wood Mantels
(See Mantels)

Wood Ornaments
Waddell Mfg. Co.

Wood Trimmers
Fox Machine Co.

Wood Working
Lestershire Lumber & Box Co.

Wood Working Machinery
American Wood Working Mach'y Co.
Barnes, W. F. & John.
Barnes Tool Co.
Cordesman Machine Co.
Fay, J. A. & Egan Co.
Fox Machine Co.
Kidder, R. E.
Long Island Machinery Co.
Marston, J. M. & Co.
Parks Ball Bearing Machinery Co.
Seneca Falls Mfg. Co.

Wood Working Machinery, Second Hand
Long Island Machinery Co.

Material from the $50,000,000 St. Louis World's Fair

Low Prices on Lumber, Building Material, Merchandise, Machinery, Household Goods, etc.

SAVE 30 TO 50%

on anything you need on the farm, in the home or shop. Study carefully the reasons why we are able to quote lower prices than anybody else, and then decide to place a trial order with us. The Chicago House Wrecking Company, (Capital and Surplus $1,000,000) is the largest institution of its kind in the world. We are constantly buying stocks of **New General Merchandise, Household Supplies, etc. at**

Sheriffs', Receivers', Trustees', Assignees' and Manufacturers' Sales

This means that new goods of standard merit and quality are sold direct to you at less than actual cost price. You would be compelled to pay 30 to 50% more at other houses for same material. Do not fail to read the following special offers if you want to save money on your purchases.

NOW IS THE TIME TO BUY

supplies or materials you may need for contemplated improvements about your place. History repeats itself, and now after having dismantled every exposition of modern times, including the **Chicago World's Fair, 1893; The Pan-American Exposition at Buffalo, 1901; The Trans-Mississippi Exposition at Omaha, 1899,** and innumerable public buildings, we have purchased the **$50,000,000 St. Louis World's Fair**

and consequently have an immense stock of first class material of every kind and for every purpose. Shrewd purchasers; those who know a good bargain, and appreciate the quality of material used in the constructions of the most magnificient and expensive World's Exposition of modern times, are flooding us with orders. There is nothing used in the construction of a building of any kind, or for furnishing same, that we cannot supply. Look up your needs and get our catalogue. The prices speak for themselves. Tell us what you want. Every day finds our stock of big World's Fair bargains much smaller. Write today.

OUR GUARANTEE

We positively guarantee that all purchases of any kind made from us will be thoroughly satisfactory, and articles and supplies exactly as represented. You can place your order with us in confidence that you will not only receive just what you order and pay for, but with the further assurance that in case you find the goods not as represented, you can return same and your money will be refunded without quibbling or delay. Send us your inquiries for what you may be in need of in the line of general farm and building supplies, household goods, etc.

Our REFERENCES

We welcome investigation as to our reliability. Look us up in Dun's, Bradstreets or any other responsible commercial agency or express company. Ask any banker, or refer to the Drovers Deposit National Bank, and other Chicago banks.

Steel Roofing and Siding

new, painted on both sides, most durable and economical roofing for houses, barns and sheds—in fact for all buildings.

$1.50 PER 100 SQUARE FEET.

This is our No. 15 grade, semi-hardened, flat. 24x24 inches.

Corrugated, V Crimped or standing seam, per sq., $1.60, also comes in 6 and 8 foot lengths at 50c per sq. more.

Beaded Ceiling and Siding, per sq....$2.25

Imitation Brick Siding, per sq..............$2.25

WE PAY THE FREIGHT East of Colorado, except Oklahoma, Ind. Terr. and Texas. Prices to other points on application. No special tools needed. Full directions furnished.

LOWEST PRICES ON LUMBER OF ALL KINDS

Including building material of every description from the St. Louis World's Fair. Here is your one chance to get a lumber bargain.

Over 100,000,000 Feet of the Finest Grades of Lumber were used in the construction of these grand exhibition palaces. Now offered at **EXCEEDINGLY LOW PRICES.** The time to buy lumber and building material is today. Don't delay. The supply is fast vanishing.

SEND US YOUR LUMBER BILL FOR ESTIMATE.
Save 30 to 50% if you buy at once.

Studding, joists, planking, dressed and matched flooring, sheathing, timbers, in fact, lumber for any purpose.

ASK FOR OUR SPECIAL WORLD'S FAIR CATALOGUE.

Quick delivery. Besides lumber we have all kinds of sash, doors, hardware, electrical apparatus, flags, poles, tools, turnstiles, statues, railing, molding, iron rods, and thousands of other articles.

We have a branch house on the exposition ground, St. Louis, Mo.

"Eagle" Felt Roofing

60c PER HUNDRED SQUARE FEET.

2 Ply "Eagle" Brand Ready Roofing, without supplies, per sq............60c

3 Ply "Eagle" Brand Ready Roofing, without supplies, per sq............90c

Vulcanite Roofing with nails, caps and cement, per sq....................$1.75

Red Rosin Sheeting Paper, 500 sq. feet....................45c

Galvanized Rubber Roofing, extensively used on high grade buildings, practical for lining purposes. Nails, caps, cement, furnished complete, 108 sq. feet....................$1.50

Better grades also.

Eave Troughs, Down **Spoutings,** Valleys, Ridge **Rolls, etc.**

SAMPLES FREE.

NEW FELT ROOFING

STOVES & RANGES

FROM THE WORLD'S FAIR

We have over 200 Stoves for sale that were used only during the Exposition.

Oak Heaters....Each, $3.95

Hot Blast Stoves,
Small size at..........$7.00
Medium size at........ 9.50
Large size at..........12.75

Cannon Heaters,
Small size at..........$4.80
Large size at.......... 7.75

Air Tight Wood Heaters from........$1.50 to $7.50

Kitchen Ranges from $4.00 to $20.00

Extension Table $10.25

Best selected oak, with finest Golden Oak finish, top 42 inches, pillars 7 inches thick, hand carved, 6 ft. extension, each..............$10.25
8 ft. extension..$11.75

Like Cut

500 Tables in handsome designs from St. Louis Fair at $3.90 to $25 each.

Send for Catalog.

CHAIR BARGAINS

500 beautiful box fashioned dining room or library chairs exactly like illustration. Can be had in Golden, Flemish or Weathered Oak finishes. Seats of genuine hand caning. Pattern entirely new. While they last each..............98c

Others at 90, 80, 70, and 60c.

World's Fair Furniture

$100,000 worth of high grade furniture from the World's Fair.

100 Morris Chairs. ....Each, $5.50
150 Couches.....Each, $4.00 to $5.00
250 Office Desks..........Each, $16.00
2,000 Dressers............Each, $5.00
2,000 Iron Beds............Each, $2.25

12 Ton Jack Screws 80c

Four Carloads, Brand New Cast Iron Stand, wrought iron screw, deep cut thread. The best made, and biggest bargain in the lot at these prices.

1½ in. diam.,	12 ton......	$0.80
1¾ " "	16 "	1.10
2 " "	20 "	1.15
2¼ " "	24 "	1.85
2½ " "	26 "	2.40
3½ " "	26 "	5.25
House Raising Jacks, ea.		1.40
Lever Jacks, each........		5.00

LINOLEUM & CARPETS AT HALF PRICE

FROM THE FIFTY MILLION DOLLAR WORLD'S FAIR

Thousands of handsome modern pieces of household effects were included in our purchases of the various foreign, state and public buildings. Don't you recall the many rich furnishings, the fine carpets, rugs, etc.! We have thousands of good things to offer in this line at **one-half their real value.**

1000 Yards Oil Cloth, good as new, excellent patterns, fine heavy body, various designs, 1, 1½ and 2 yards wide, per square yard.............................19 cents

8000 Yards Semi Scotch Linoleum, finest quality, practically new, handsome assortment of designs, in 2 yard widths, medium quality, per square yard, 35 cents. Heaviest quality, per square yard...40 cents

250 Floor Rugs, heavy texture. 6x9, each......$1.90

Large variety, combination of colors, from 50c to $50

400 Yards Ingrain Carpet, dark green body, floral designs, full widths, thoroughly renovated, looks like new. Price, per yard........................80 cents

ROPE BARGAINS

An unusual opportunity for anything in the line of rope, binder twine, etc. at prices like these.

Good Manila Rope, slightly used, all sizes, ⅝ inch, per 100 ft..........$2.75

New Manila Rope, slightly shopworn, per lb.......................................10c

Wrapping twine, lb. 5c

Galvanized Guy Wire per hundred ft. $1.60

Wire Rope and Cable at way-down prices.

Tackle Blocks, Derricks, etc. Write for prices.

$5.10 Anti-Freezing Pump

Special Offer on Pumps.

Windmill lift pumps, each........$3.65
Double Acting force pumps, 9.00
Pitcher Spout pumps.. 0.95
Kitchen Force Pumps. 4.50
Thresher Tank pumps 5.50
Hydraulic Rams...... 4.75

Galvanized Storage tanks, tank wagons, hog troughs, hot water tanks and tanks of every kind,—water lifts, rubber and leather belting at very low prices.

GASOLINE ENGINE $60

2 H. P. fine farm engine, for sawing wood, pumping, churning and general purposes. An economical farm power. **Guaranteed,** $60.00

With pumping jack, ... $65.00

Machinery of all kinds. Engines ranging from 1 to 1000 H. P. Pumping machinery and equipment.

100 LBS. WIRE $1.40

Lowest Prices on Galvanized Wire.

Wire Shorts, No. 14 gauge, per 100 lb. bale....................................$1.40

Annealed Wire, new, 11 to 16 gauge, per 100 lbs.....$1.90

B. B. Telephone Wire, continuous lgths, 100 lbs. $2.75

Painted Barbed Wire, 100 lbs. $2.20

Galvanized Barbed Wire, 100 lbs. $2.60

Poultry Netting, galv, 100 sq. ft...40c

PIPE

10,000,000 feet of pipe, overhauled and in good condition. It came from the Exposition. Wrought Iron Pipe with screwed ends and threaded couplings, straight and in good condition.

	1 -inch, per foot................	3½ cts.
	1¼-inch, per foot................	4½ cts.
	1½-inch, per foot................	5½ cts.
WELL CASING	8 -inch, per foot......	10 cts.
	4¼-inch, per foot......	17 cts.
	5⅝-inch, per foot......	30 cts.

Paints, 30c Per Gallon

WRITE FOR COLOR CARD, FREE

Barn Paint, in barrel lots, per gal..80c

Cold Water Paints, per pound 6c

"Perfection" Mixed Paints, per gal......75c

"Premier" Brand, 3 year guaranteed, per gal..95c

Varnishes, Venetian Red, **Oils,** stains and everything in the paint and oil line.

Orders Filled Promptly

READY MIXED PAINTS

MODERN PLUMBING MATERIAL

We offer you a saving of **20 to 50** per cent on anything you need in this line. We can furnish you all the comforts of a city dwelling even if you have no water supply. With our modern "Country Homes Water Supplies" you live like a king. **Write us for full facts.**

Handsome Steel 4½ ft. Bath Tub..........$6.30
Enameled Sinks..........$1.10 up
Water Closets, complete..............................$7.00 up
Wash Stands, handsome, all well finished, complete.... 7.50 up
A Modern Bath Room Outfit, complete................25.00 up

Ask for our plumbing supply catalogue. It's worth having.

$6.30

Wire Nails, $1.50 Per 100 Lbs.

10,000 Kegs Mixed Wire Nails, each containing 100 to 110 lbs., and ranging from 3 to 30 pennyweight, all kinds in each keg. Special price per keg..$1.50

Wire Spikes. Per 100 lbs......$1.90

Wire Nails. One size. 100 lbs. $2.00

Cement Coated Wire Nails. Per keg..........$1.70

OUR NEW 500 PAGE CATALOG No. 23 FREE

This book is one that every shrewd buyer must send for. It is full of bargains from cover to cover, and quotes the very lowest prices on everything needed on the farm and in the home. You will save money by referring to it often. The list above shows only a few articles out of thousands described, but the prices give you an idea of what you can save by sending your orders to us. Cut out this ad. Make a cross mark on those items that most interest you, and we will send you much valuable information. Also fill in the coupon to your right. Our new catalogue will be sent you absolutely free and prepaid.

Or send us your name and address, where you have seen this ad. and what items interest you.

CHICAGO HOUSE WRECKING CO., 35th & Iron Sts., Chicago, Ill.

Chicago House Wrecking Company, 608
35th & Iron Sts., Chicago.

I am a reader of Carpentry & Building. Send me one of your large 500 page catalogues as advertised in this paper.

NAME..
ADDRESS..
R. R. OR P. O. BOX..
STATE..

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

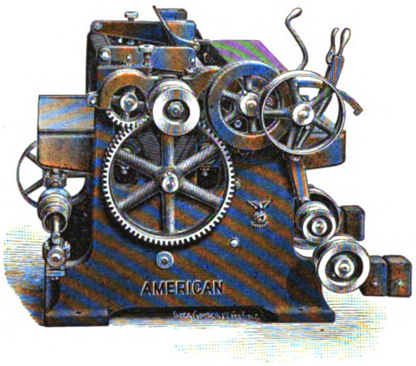
Digitized by Google

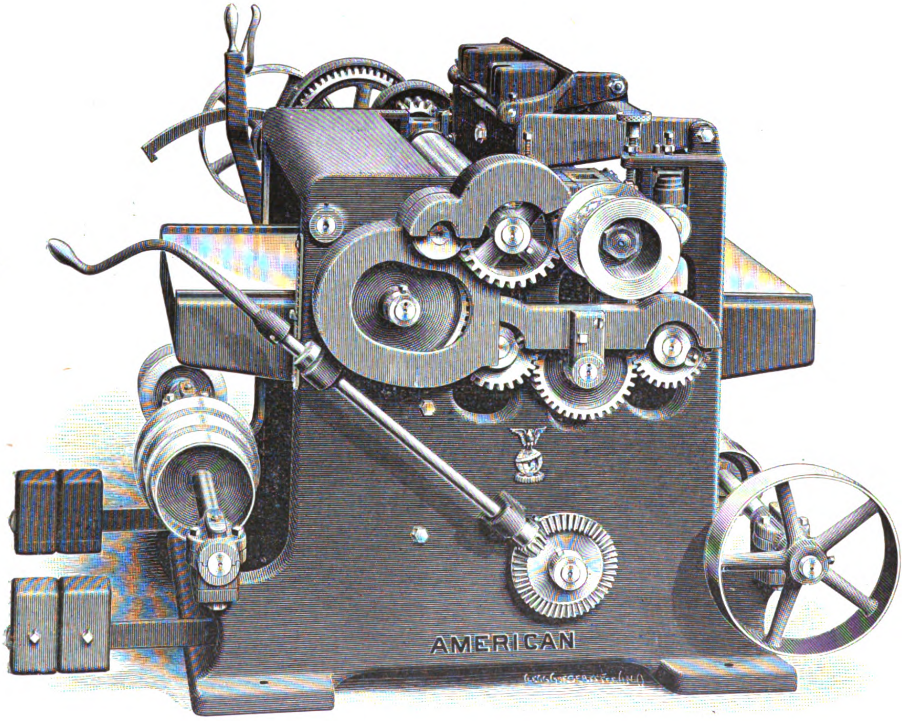
Original from
UNIVERSITY OF MICHIGAN

AMERICAN

No. 112 Single and Double Surfacers

Working 24" or 30" wide by 7" thick. Four power driven rolls, geared at both ends. In-feeding roll solid or divided, as ordered. Top cylinder double belted, patent side clamping cylinder boxes and other valuable features. Write for complete description.

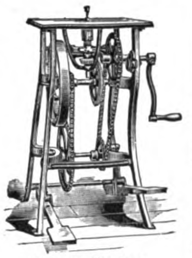


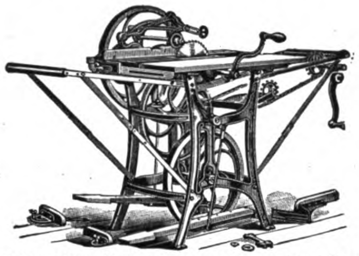


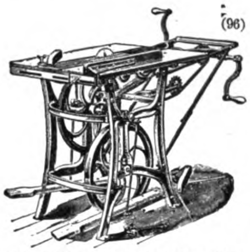
AMERICAN

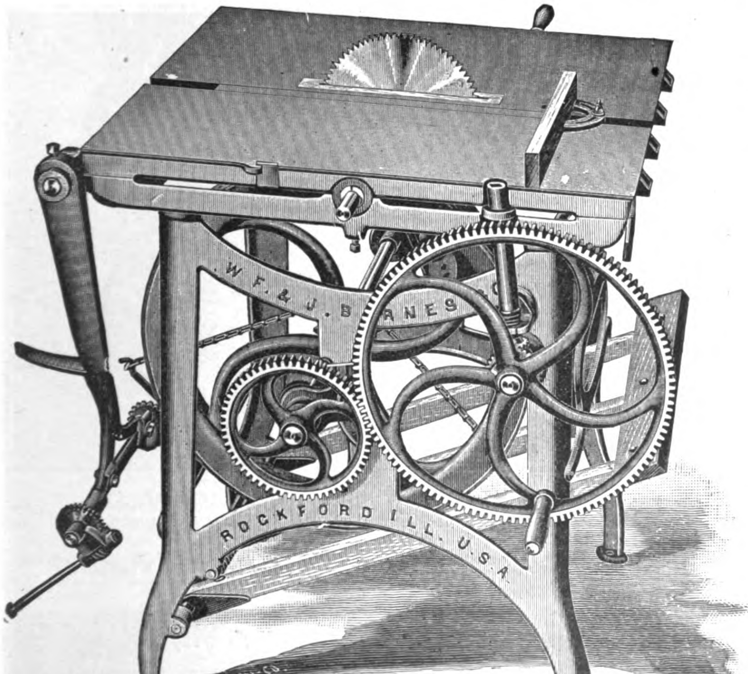
WOOD WORKING MACHINERY CO.

NEW ORLEANS CHICAGO NEW YORK







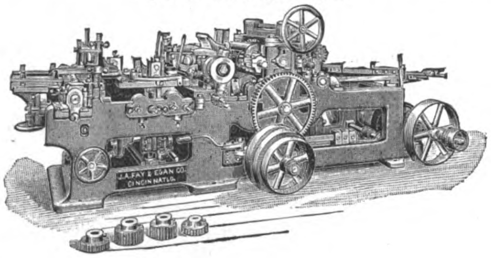


W. F. & J. BARNES CO
ROCKFORD ILL. U.S.A.

ARE YOU THINKING OF GETTING

Wood-working Machines? That's all we make—been making it 75 years, for the four corners of the world. It will pay you to investigate them.

Ever interested in motor-driven tools? They're slowly but *surely* coming. We're furnishing them right along.



No. 133 new Four Side Inside Molder, 12 or 15 by 6 inches. For light or heavy work. Replete with labor-saving devices, and has all the latest improvements.

We make a complete line of inside and outside molders—smallest to largest sizes—each having Fay & Egan quality—a guarantee for merit.

J. A. FAY & EGAN CO. 221-241 W. Front St. CINCINNATI, O.

Catalogue, books on band saws, sanders or universal wood-workers, free.

LARGEST BUILDERS OF WOOD-WORKING MACHINERY IN THE WORLD

ASTEROID THE PERMANENT **ROOFING.** SCOTT & CO., 233 E. Front St. CINCINNATI, O. AGENTS WANTED

A Clever and Radical Change

in the estimating line that will prove profitable to the investor and cultivator of the A. B. C. SCHEDULES, or ITEMIZED BLANK ESTIMATING FORMS for the use of

Contractors and Builders

These Schedules are superior to anything of the kind already for sale. Not a text book on estimating, or a series of tables, but just a series of simple commonsense Blank Forms, giving a complete list of all items entering into the construction of a building.

It Will Pay You To Investigate This

There is a separate and complete schedule for each of the following trades:

Carpenters, Masons, Plumbers, Painters

A sample copy of each schedule covering any of the trades for 25c. A complete book (one of each series) **ONE DOLLAR.**

The Gem Publishing Co.

P. O. Box No. 14 Brooklyn, New York

PLUMBERS' SUPPLIES
AT WHOLESALE.

If you need anything in my line, and wish to **SAVE 20 to 40 Per Cent** on every article, write for my free illustrated Catalog. Shipments promptly made from a very complete stock of guaranteed goods. Small orders are as carefully handled as large ones.

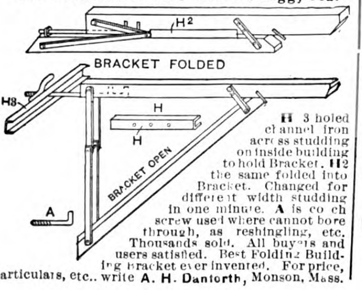
B. C. KAROL, 235 W. Harrison St., Chicago, Ill.

MARK YOUR TOOLS WITH A

SEND FOR PRICE-LIST No. 7

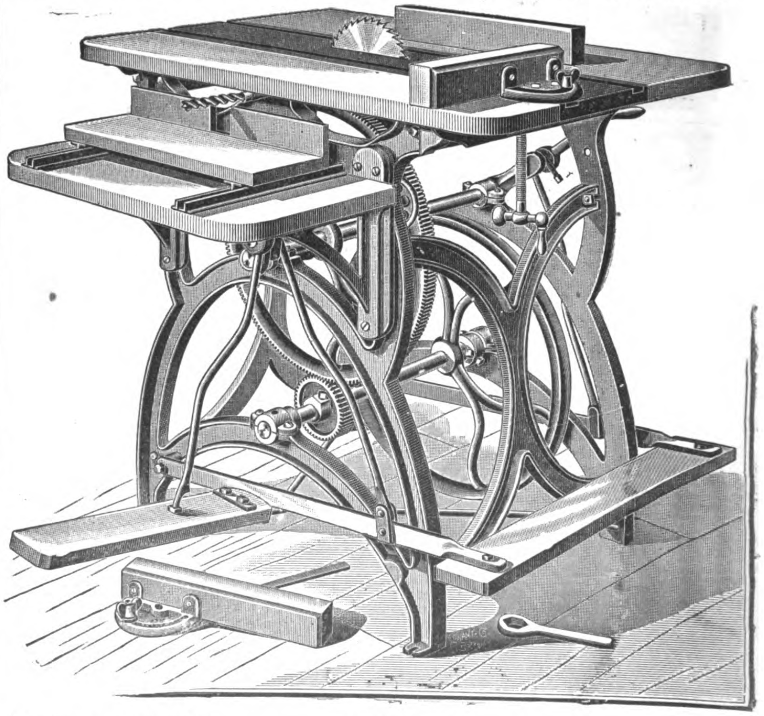
FOLDING BUILDING BRACKET (Patented)

One Dozen Carried Under Concord Buggy Seat



H 3 holed channel iron across studding on inside building to hold Bracket. H2 the same folded into Bracket. Changed for different width studding in one minute. A is coach screw used where cannot bore through, as reshingling, etc. Thousands sold. All buyers and users satisfied. Best Folding Building bracket ever invented. For price, particulars, etc., write **A. H. Danforth**, Monson, Mass.

Marston's Hand and Foot Power Circular Saw.



Iron frame, 36 inches high.

Center part of top is made of iron accurately planed, with grooves on each side of saw for gauges to slide in.

Steel shafts and best babbitt metal boxes.

Gears are all machine-cut from solid iron.

Boring table and side treadle.

Two 7-inch saws and two crank **handles** with each machine.

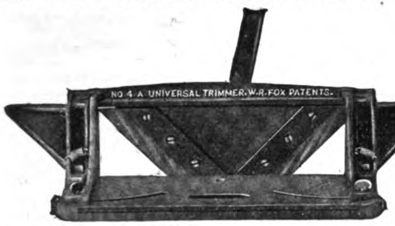
Weight complete, 350 pounds.

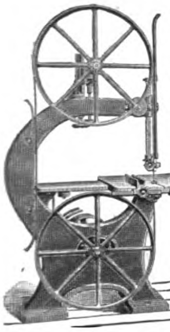
Send for catalogue.

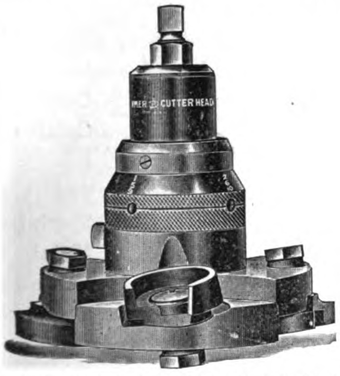
J. M. MARSTON & CO., 201 Ruggles St., Boston, Mass.

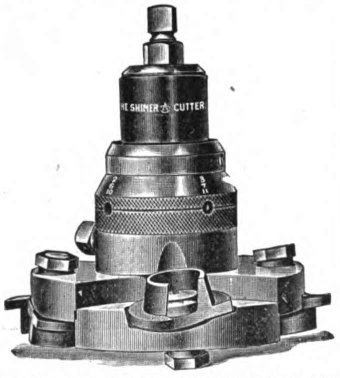
OUR descriptive catalogue of Building Trades Books will interest every progressive Carpenter and Builder.

DAVID WILLIAMS CO., 14-16 Park Place, N. Y.


NO 4 A UNIVERSAL TRIMMER W.R. FOX PATENTS




SHIMER CUTTER HEAD


SHIMER CUTTER


DIAMOND
EXPANSION SHIELD

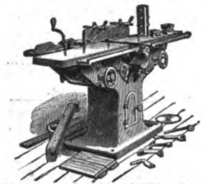
CORDESMAN, MEYER & CO., 26, 28 and 30 Central Avenue,

CINCINNATI, OHIO.

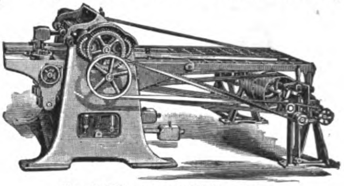
Finest Grades of Latest Improved

Wood-Working Machinery

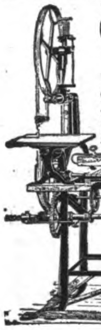
For Planing Mills, Furniture and Chair Factories, Carriage, Wagon and Agricultural Works. Circulars and prices. Correspondence solicited.



Universal Wood-Worker.



No. 2 Planer and Matcher.



Ball Bearing

MACHINERY.

Great improvement for foot power, Rip Saw, Band Saw and Boring. All ready for use, same for power. Other attachments and useful tools.

Manufactured by

PARKS

Ball Bearing Mach. Co.
Sta. A.,
Cincinnati, Ohio

DO YOU WANT THE BEST

DRAWING TABLE

made? If so send for illustrated catalogue and prices.

R. E. KIDDER,
22 Hermon Street, Worcester, Mass.

SECOND-HAND WOOD WORKING MACHINERY

Woods Moulder 12 in.	Matchers 24 in.
Berlin Moulder 15 in.	Pony Planers 16, 20, 24 in.
Rogers Moulder 8 in.	

Variety Machines, Double and Single, Jointers, Swing Saws, Rolling Top Saw Tables, Gas and Gasoline Engines, Band Saws, Routers, Sanders, Circular Saws, Jig Saws.

A1 CONDITION. PROMPT DELIVERY.

All Kinds of Machinery Purchased for Cash.

LONG ISLAND MACHINERY CO.
15 Washington Ave., Brooklyn, N. Y.

"STAR ENCAUSTIC TILE CO.,"

MANUFACTURERS OF

Superior Unglazed Encaustic Tile

For Floors in Stores, Churches, Depots, Kitchens, Halls, Porches, &c.

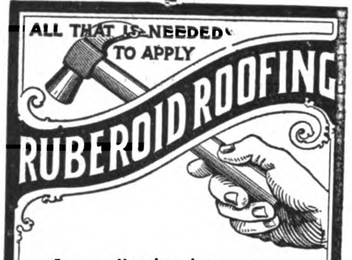
Office and Factory, Bluff Street, near Gist,
PITTSBURG, PA.

MONTROSS ROOFING IS CHEAPER

Galvanized Octagon Shingle, no painting or after care.

than SLATE or WOOD, lasts longer, fire-proof, ornamental, easily laid, no repairs. Catalog, prices and testimonials free.

Montross Metal Roofing Co., Camden, N. J.



Its application is very simple— no experienced help is needed. With every roll are included nails, tin caps and cement sufficient for the work. **RUBEROID** is so pliable that it fits anywhere.

THE well-told truth has for 13 years drawn builders' attention to **RUBEROID ROOFING**—demonstration of this truth has made its believers legion. **RUBEROID ROOFING** does all claimed for it. It *is* water and weather-proof. Its resistance to acids, gases, great heat and even fire is extraordinary. It will *not* melt, rot or crack. But "above all things" avoid imitations. Look for the registered trade mark "**RUBEROID**" always stamped on the under side. Send for samples.

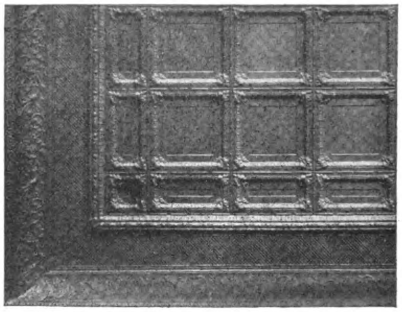
MANUFACTURED SOLELY BY

THE STANDARD PAINT CO.,
100 William St., New York.
CHICAGO OFFICES: 188-90 Madison St.

THE EDWARDS METAL CEILINGS

FIRE-PROOF, DURABLE, DUST PROOF, ARTISTIC, SANITARY

Cornices, Skylights, Corrugated Iron, Metal Shingles, Steel Roofing, Siding, Etc.



Write for General Catalog L and Special Metal Ceiling Catalog

THE EDWARDS MANUFACTURING CO.
EGGLESTON AVE. "The Sheet Metal Folks" CINCINNATI, OHIO.

We make Ceilings for churches, schools, stores, lodge rooms, court rooms, libraries, residences, etc.

Our ceilings are shipped ready for erection. No expert labor required. Working drawings furnished. They're adapted to any kind of building. Exclusive in classified design.

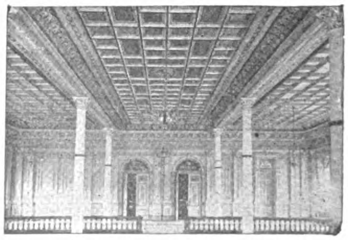
Berger "CLASSIK"

Steel Ceilings

We also make Steel Roofing, Siding, Metal Shingles, Architectural Sheet Metal Work and Fireproofing Material.

Our catalogues sent you free. Ask for them.

THE BERGER MFG. CO.
CANTON, OHIO.
New York. Boston. Phila. St. Louis



"AMERICAN"
Polygon Conductor Pipe

Can be furnished in either Galvanized Iron or Copper. It is made from galvanized iron in 10-ft. lengths, without a cross seam; from copper in 8-ft. lengths.

American Rolling Mill Co., MIDDLETOWN, OHIO.

Portable Hollow Concrete Block Machine

BEST—FASTEST—SIMPLEST—CHEAPEST.
MOVE THE MACHINE—NOT THE BLOCKS

Saves labor of off-bearing, avoids loss by crackage or breakage, saves expense of heavy cumbersome iron pallets. Sand, Water and Portland Cement only materials required. BIG PROFITS. Blocks cost 6 cents to make. Sell for 18 cents. Whole outfit costs $125.00.

FULLY GUARANTEED. SENT ON TRIAL.

THE PETTYJOHN CO., 616 North 6th Street, TERRE HAUTE, IND.

Simplicity, Rapidity
Adaptability, Durability
ARE THE FOUR CARDINAL POINTS
Combined in

NO Wheels, Chains, Cogs, Gears or Cranks. Nothing to Clog, Break or get out of order. No loss of time or labor.

The Ideal Hollow Concrete Block Machine

"The Peer of All"

Manufactured by

Ideal Concrete Machinery Co.
Formerly Aurburn, Ind. **South Bend, Ind.**

Handsome Catalog and Booklet for the asking.

Face formed on bottom of the mould. Cores withdrawn horizontally by lever —not by hand. **Guaranteed** capacity, two men, 10 hours, 200 blocks. A portable machine that can be carried with ease by two men. Over 200 in use in the State of Indiana alone. The only machine with which can be accomplished the facing of blocks by the Borst system. A business proposition to the maker of blocks. An appeal to the common sense judgment of the builder.

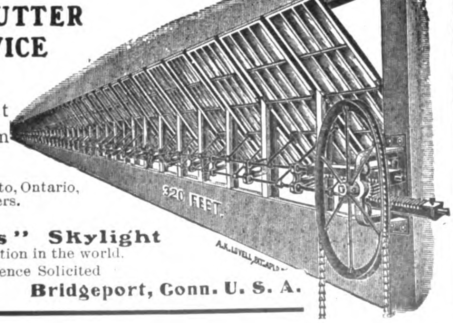
In corresponding with us we make our business your interests.

SECURE
PROTECTION AND LONG SERVICE BY USING OUR
ASPHALT ROOFING
SAVES REPAIRS
SAVES RECOATING
SAVES RENEWING
Send for Samples and Pamphlet
STOWELL MFG. CO.
JERSEY CITY, N.J.

THE LOVELL WINDOW AND SHUTTER OPERATING DEVICE

For Factories, Foundries, Etc.

A line of sash 500 feet long can be operated from one station if desired.



THE VOLKES HARDWARE Co., Toronto, Ontario, Sole Canadian Manufacturers.

WE ALSO MAKE

The "Anti-Pluvius" Skylight
Best skylight construction in the world.
Correspondence Solicited

The G. DROUVÉ CO., Bridgeport, Conn. U. S. A.

GRINDSTONES.

Mounted Grindstones for Carpenters' or Anybody's Use.

THE CLEVELAND STONE CO.,
6th Floor, Hickox Bldg., CLEVELAND, O.

WHEELING CEILINGS MADE OF STEEL

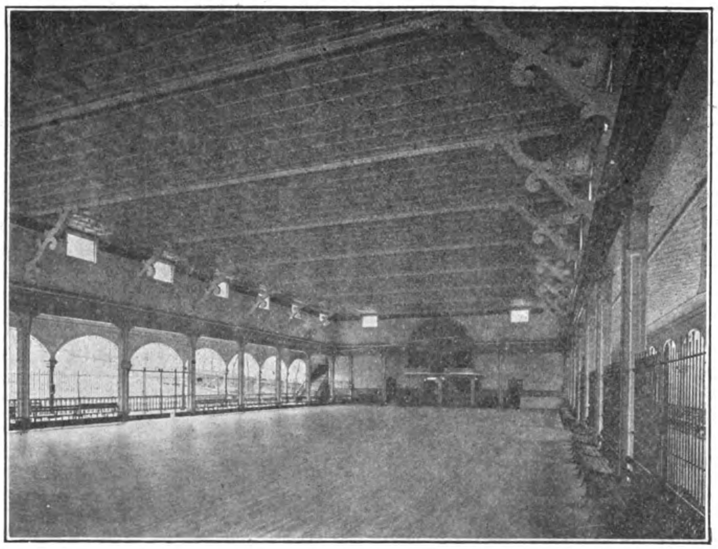
MANUFACTURED BY
WHEELING CORRUGATING CO., Wheeling, W. Va.

Fire Proof

The Most Artistic Interior Finish

Moderate in Cost

For Buildings of all Kinds



Send Plan

Ask for Estimates

Large Stocks Carried in all Our Warehouses

Nothing Too Large For Us

STEEL CEILING, LUNA PARK, PITTSBURG, PA., DESIGNED AND ERECTED BY US

BRANCH OFFICES AND WAREHOUSES

NEW YORK CITY - - - - - - 47-51 Cliff Street
CHICAGO - - - - - - - - 45 and 47 Lake Street
ST. LOUIS - - - 112-114-116 South Eighth Street
PHILADELPHIA - - - - - 402-404-406 Race Street
BOSTON, MASS. - - - - - - 132 and 134 Pearl Street
CHATTANOOGA, TENN. - - - - - King Street

Facts about

ASTEROID . . THE . . PERMANENT ROOFING

"Asteroid" is a strictly high grade Felt (not paper) Roofing.
Contains no Coal Tar. Waterproof.

It is a "completed" Roofing material. Requires no special tools to apply. Suitable for flat or steep roofs. Used successfully everywhere. Always pliable and workable. Practically fire proof. Unaffected by Acid, Alkali or Gas fumes. Costs no more than good tar and gravel and lasts longer. Altogether a most admirable fabric for general building and insulating purposes. Avoid Coal Tar goods for permanent work. Coal Tar is an uncertain, fleeting material requiring frequent renewal.

FOR 33 YEARS THE MANUFACTURE OF PAINTED AND GALVANIZED

IRON and STEEL ROOFING, CORRUGATED ROOFING and SIDING

And all other Sheet Building Materials has continued at the Works of

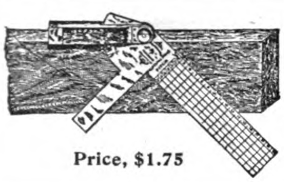
SCOTT & CO.

ESTABLISHED 1872

233 East Front St., CINCINNATI, O.

Send for Catalog A.

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google



Price, $1.75

TOPP'S FRAMING TOOL.

A PERFECT TOOL and the only Tool for the purpose ever invented.

Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

Write for booklet. Address the manufacturers,

G. A. TOPP & CO., - Indianapolis, Ind.

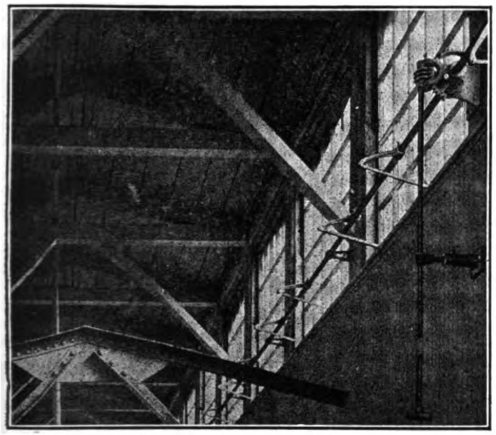
YOUR INVENTION IS NOT PROTECTED

unless covered by a GOOD, STRONG PATENT. Many patents are worthless because their "claims" are so weak that the slightest variation in the structure of the patented article or machine is not covered. Your invention should be protected by a patent having the strongest "claims" obtainable. I can obtain such a patent for you. Send for booklet. References to clients throughout the United States.

GEO. R. HAMLIN, Patent Attorney,

"I procure Good Patents" **800 H ST., N.W.** (One block from Patent Office,) **Washington, D. C.**

Ventilating Tasks.



Our Sash Operating Apparatus shifts one sash or 100 of them—with perfect ease. Total absence of chains, cables, springs or complicated system of levers or sliding gears.

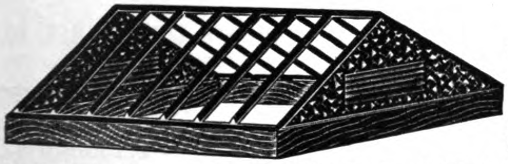
Can be operated from any desired location. R. H. Macy's store, Otis Elevator Factory and hundreds of others use our devices.

Send for Catalog X-V

BURNHAM-HITCHINGS-PIERSON CO.

1133 Broadway, cor. 26th St., New York.

Boston Branch: 819 Tremont Building.



ART METAL CEILINGS

Exclusive and Artistic Designs appropriate for any style of architecture.

All Styles Galvanized and Copper Skylights, Cornices, Finials, Crestings, Ventilators, Metal Shingles, Roof Gutters, all styles painted and galvanized Iron Roofing and Siding, etc. Write for Catalogue and Prices. Estimates free.

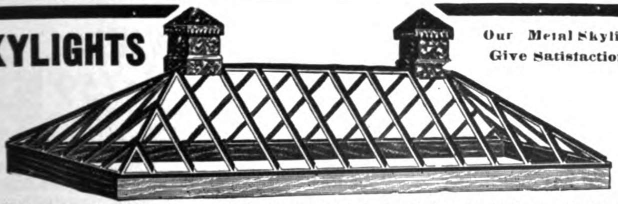
Kanneberg Roofing & Ceiling Co.,

Manufacturers,

CANTON, OHIO.

SKYLIGHTS

Our Metal Skylights Give Satisfaction.



They are so constructed that all condensation is carried to the curb and discharged through weep holes on to the roof without soaking between laps.

The peculiar construction of the curb on our skylights renders counterflashing unnecessary.

Frames of galvanized iron or copper, with glass of any kind or thickness.

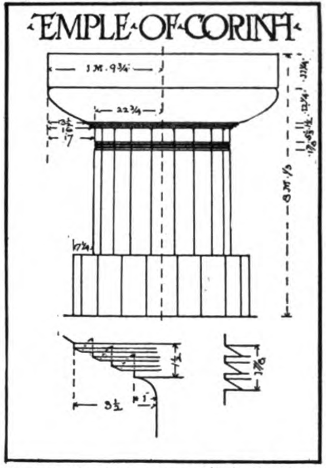
Write for our New Cornice, Skylight and Ornament Catalog.

THE CANTON STEEL ROOFING CO., Canton, Ohio

ARCHITECTURE

TAUGHT BY MAIL

OUR courses in Architecture are prepared for the purpose of helping those who, for any reason, have been unable to go to a resident technical school, and to aid experienced draftsmen and practicing architects to "brush up" for more responsible work.



From instruction papers on "The Orders"

The instruction is planned to cover the actual problems arising in daily work. It comprises Mechanical Drawing; Descriptive Geometry; Isometric, Perspective and Free Hand Drawing; Pen and Ink Rendering; Shades and Shadows; and the conventional methods of making, figuring, lettering, and coloring plans, elevations, sections and details. The design and figuring of columns, girders, beams, and connections is also taught. Building Materials, Building Construction and Details, including framing-sheet metal work, fire proofing, gas piping and electric wiring are thoroughly covered. The principles of Heating, Ventilation and Plumbing, and the various systems are described. Building Superintendence, Specifications and Contracts, Building Laws and Permits, and general office practice are carefully taught, and are illustrated with reproductions of actual office drawings from some of the foremost American architects.

Nearly 100 courses in Architecture, Contracting and Building, Architectural Drawing, Carpentry, Structural Drafting, Perspective Drawing, Heating, Ventilation and Plumbing, Electrical, Mechanical, Steam, and Civil Engineering; Mechanical Drawing and College Preparatory (preparing for entrance to resident Engineering Colleges).

Write for illustrated 200-page Bulletin, giving full outline of the above courses.

AMERICAN SCHOOL OF CORRESPONDENCE, Chicago

Mention Carpentry and Building

We Give Particular Attention To Special Designs

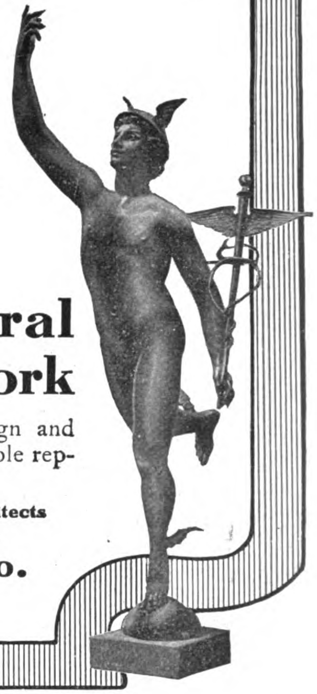
and are fully equipped to execute the most intricate and delicate work ever attempted in sheet metal.

Mullins
Art Architectural Sheet Metal Work

is far in advance in architectural design and artistic execution and has won an enviable reputation for excellence.

Estimates, Designs, etc., submitted to architects builders and contractors on request.

The W. H. Mullins Co.
208 Franklin St., Salem, Ohio.
(Everything in sheet metal.)

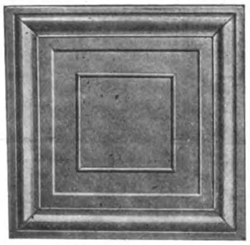


Better Cisterns—Why?

To protect the health of every member of your family. Medical experts have pronounced the brick and wood cistern to be the cause of many cases of sickness.

A Cistern to be perfectly sanitary must be made so tight that no impurities can possibly get through. This can only be accomplished by using the steel cistern.

O. K. Harry Steel Works,
2341 Papin St., St. Louis, Mo.



LOCK-JOINT METAL CEILINGS

Absolutely Dust Proof. Easily Erected. Artistic Designs.

——*Ask for Catalogue "D"*——

S. KEIGHLEY METAL CEILING & MFG. CO.
PITTSBURG, PA.

ARCHITECTS
CONTRACTORS
BUILDERS

When you want any Structural Work it will pay you to write to the

BOSTON BOLT COMPANY
ESTABLISHED 1872

CONVERTORS OF

Iron and **Steel** into all kinds of shapes and dealers in

Contractors' Supplies

Send for our latest Catalog.

284 Franklin St., - Boston, Mass.
JOHN W. CROOKS, Treasurer.

PRODUCERS OF

ROOFING SLATE

SLATE BLACKBOARDS.

E. J. JOHNSON & CO
38 Park Row,
New York.
Quotations delivered anywhere.

Slaters' Supplies, Snow Guards.
Write for Price Book.

TOP IT OFF WITH The Willis Cresting Tiles No. 59

and make a perfect and handsome roof. They are made of Tin, painted, Galvanized Steel, Copper and Coppered Steel, and suitable for either slate or shingle roofs.

Send for miniature samples and our Catalogue No. 5, showing a very complete line of cornices, crestings, finials, skylights, and stamped ornaments in zinc, and STEEL CEILINGS, etc.

WILLIS MFG. CO., Galesburg, Ill.
Makers of the Willis Hip Shingles.

Importance of Safe Roof Trusses.

Mistakes in designing and figuring wooden beams and trusses are often of a serious nature.

The *Engineering News* in reviewing the new book, "STRENGTH OF BEAMS, FLOORS AND ROOFS," by F. E. Kidder, has this, among other things, to say:

> "This book calls attention to a number of wooden roofs that are shocking in their disregard of structural principles. Some of these roofs were actually built before better advice made itself felt. It is unfortunately true, however, that worse examples may be found. The matter in the present book is valuable (not least) as a contribution to public safety."

With respect to the character and scope of this treatise the review further says:

> "The title might be put: *How to Design and Figure Wooden Beams and Trusses; For the Practical Builder*, as this would characterize the contents fairly well.

: : : : : :

It is a book the progressive Builder, Carpenter and young Architect will not fail to have.

: : : : : :

222 pages and 164 engravings from original drawings. : : : : : :

$2.00, Prepaid.

DAVID WILLIAMS CO., Publishers,
14-16 Park Place, New York.

GET OUR PRICES ON

METAL CEILINGS,

TIN PLATE,

EAVES-TROUGH, CONDUCTOR PIPE,

CHARCOAL IRON TIN,

CORNICE, SKYLIGHTS, FINIALS, ETC.,

BEFORE BUYING.

J. H. ELLER & CO., . Canton, O.

Combines durability, low price, ease of application, fireproof qualities and sightliness, just what the buyer of roofing material demands.

The cheapest way to repair old shingle roofs is to cover with **PERFECTED GRANITE ROOFING.**

SEND FOR PHOTO PAMPHLET.

Eastern Granite Roofing Co., Irving Building, New York.

THE KINNEAR

STEEL CEILING

LOCK JOINT

INTERLOCKING JOINT
QUADRUPLE LOCK JOINT } *Patented*

PERFECT CONSTRUCTION.

Send your specifications and plans to us for estimate
Catalogue or Booklet furnished upon request.
Prompt service guaranteed.

THE KINNEAR & GAGER COMPANY,
Manufacturers
COLUMBUS, OHIO
New York, 726 Lexington Ave.
Boston, 125 Broad St.

$105 FOR STORE ELEVATOR

(ELECTRIC)

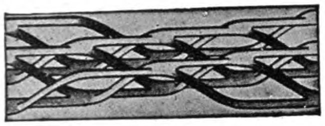
COMPLETE, READY TO ERECT, MADE BY THE HUNDRED. SIMPLE IN CONSTRUCTION. EASILY CARED FOR. OTHER STYLES AND PRICES TO SUIT.

The Warner Elevator Mfg. Co., 2100 Valley St., CINCINNATI, O.
New York Office, 2032 Park Row Bldg.

$105

Kuhne's Truss Metal Lath and Structural Element

Steel Concrete



Best Concrete Binder, Self-centering—For General Fire-Proof Constructions, such as Partitions, Floors, Stairs, Outside Walls, Roofs, Sidewalks, Sewers, Tanks, etc. Patented January 1, 1901.

(CATALOGUES ON APPLICATION.)

TRUSS METAL LATH CO., 15-25 Whitehall St., New York City
MANUFACTURING AND SALES DEPARTMENT:
GOFF, HORNER & CO., LIMITED, Frick Building, Pittsburgh, Pa.
MILLS AT ZANESVILLE, OHIO.

PEERLESS MORTAR COLORS.

THE BRIGHTEST, STRONGEST AND MOST DURABLE.

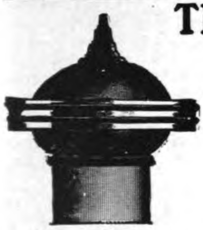
SPECIAL SHADES MADE TO ORDER.

BUCK LEAD
WILL NOT CHALK, CRACK, NOR PEEL OFF

ESTABLISHED 1844.
SAMUEL H. FRENCH & CO.,
PHILADELPHIA.

CROWN PAINT
READY MIXED IN PURE LINSEED OIL
GIVES SATISFACTION

THE "GLOBE" VENTILATOR



In Brass, Copper, Galvanized Iron and with Glass Tops for Skylight Purposes. Also

"Globe Ventilated Ridging"

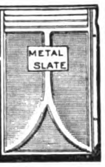
For Barns, Residences and Buildings of every character. Far superior to a Cupola.

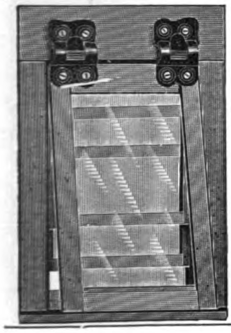
Send for Description and Price List.

Manufactured by **GLOBE VENTILATOR CO.** Troy, N.Y.

CORTRIGHT

The difference between the out-of-date and the up-to-date carpenter is—the latter lays Cortright Shingles and makes money. In which class are you?
CORTRIGHT METAL ROOFING CO. Philadelphia and Chicago





Full-length window screens keep out all the flies and protect the windows. Screens attached with

**GOSSETT'S
Detachable Suspension
HINGES**

are easily put up or removed—no tools or ladder necessary. Write for free sample pair. Price per Doz. pairs $1.20 (Express paid). Sold by Hardware and Lumber Dealers.

Manufactured by
F. D. KEES, Beatrice, Nebr.

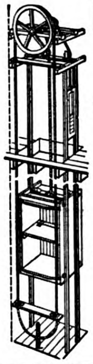
THE NEW BOOK

"Strength of Beams, Floors and Roofs"

Makes easy the Designing and Figuring of Wooden Beams and Trusses.

TWO DOLLARS, PREPAID.

DAVID WILLIAMS COMPANY, Publishers, 14-16 Park Place, New York.



DUMB WAITERS AND HAND ELEVATORS,

Trunk Lifts,
Invalid Lifts,
Carriage Elevators,
Freight Elevators,
Sidewalk Elevators,
Hatchway Hoists.

All of most improved design and construction.

Sedgwick Machine Wks.,
88 Carroll Street,
POUGHKEEPSIE. N. Y.
New York Salesroom. 128 Liberty St.

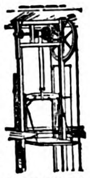
Catalogue on application.
Estimates on request.

Improved Quick and Easy Rising Steam, Electric and Hand Power Safety

ELEVATORS

AND DUMB WAITERS.

Automatic Hatch Gates.
Send for Circulars.



KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kimball Elevator Co., Cleveland, Ohio, 245 Vincent St
Branch Offices:
120 Cedar St., New York. 108 11th St., Omaha, Neb

ELEVATORS AND DUMBWAITERS

that can be placed in position by any carpenter.

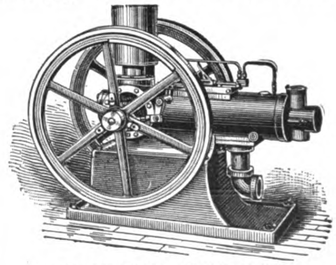
Catalogue Free,

Energy Elevator Co.
407 Cherry St., - PHILA., PA.

MIETZ & WEISS

OIL ENGINES

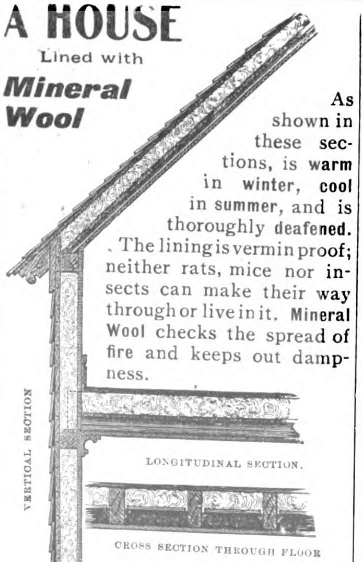
Stationary and Marine, 1 to 60 Horse Power

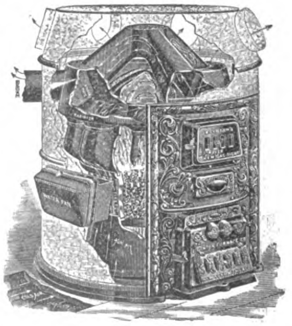


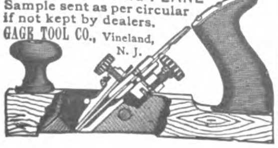
GOLD MEDAL AT ST. LOUIS

A. MIETZ
128 to 138 Mott St. 87 Elizabeth St.
NEW YORK


WOOD-MOSAIC FLOORING


VERTICAL SECTION
LONGITUDINAL SECTION.
CROSS SECTION THROUGH FLOOR





CARPENTRY AND BUILDING

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.
COPYRIGHTED, 1906, BY DAVID WILLIAMS COMPANY.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.
JANUARY, 1906.

The New York editorial and business offices of *Carpentry and Building* have been removed from 232-238 William street to 14-16 Park Place.

Popularity of Trade School Training.

The practical failure of the apprenticeship system to attract intelligent young men to the various trades to recruit the ranks of skilled workmen is the subject of much consideration by business men in all lines. While those who have been most enthusiastic in the support of the trade school training have never claimed that it made an experienced journeyman they have supported their ideas on the subject by conducting the trade school as an excellent means of preparing young men for their life work. Those who have never missed an opportunity of pointing out that the trade school graduate is not a qualified journeyman should remember that neither does the apprenticeship system as carried out in recent years make one. The most successful of the American trade schools was that founded by the late Richard T. Auchmuty, which has flourished since 1883 under the name of the New York Trade School. Many of its graduates have shown proficiency as workmen in a short time after leaving the school, and at the last national convention of the master plumbers a number of delegates spoke with pride of the fact that they held a graduate's certificate from this institution. The popularity of the trade school is no better indicated than by the records of registration this year for the New York institution. The superintendent of this school informs us that a number of the day classes for this year had reached the limit in the matter of enrollment long before the term opened on December 11. The capacity of the school in the various trades is naturally limited. The largest provisions are made for the plumbing trade, and yet all that could be accommodated in this class were enrolled in October. Whatever may be said for or against the trade school training it remains that a young man receiving instruction in the handicraft of his trade from skillful men and hearing lectures on the theory of the trade from competent men will be in possession of valuable qualifications to begin work in any trade he may select, and only needs the every day experience to be acquired in the practice to be the character of workman which all employers are eagerly seeking.

Houses for the Working Classes.

The attempt to improve the conditions of the working classes in many of the larger cities of the country is being strikingly illustrated in the model homes which are about being erected on East Thirty-first street, near First avenue, in New York City, through the munificence of Henry Phipps, who recently donated a million dollars for the purpose. The plans for the first of the series of model tenements, which are considered far ahead of any previously constructed, have been prepared by Grosvenor Atterbury, a well-known architect, and call for three units, all being identical in style and architecture. The buildings will have a combined frontage of 180 feet and a depth of 98 feet 9 inches, while the hight will be six stories and basement. The total cost of the three houses which are first to be erected will be $225,000, and it is intended to have them completed and ready for occupancy as early in the present year as possible. The design embodies many novel innovations from an intellectual as well as a sociological standpoint. In connection with the former it may be stated that none of the apartments will open directly on the street, but the entrances to the tenements will be through two large archways, each of which will measure 32 feet in length, these leading into two interior courtyards arranged with plants and playing fountains. The construction of the buildings is to be fire proof throughout, the materials comprising concrete, brick and steel. The apartments will be supplied with steam heat, hot and cold water, a gas range, washtub, sink and toilet or a shower or tub bath. In the basement of each of the buildings will be the boilers and heating appliances, a hygienic laundry and drying rooms, storage rooms, children's playrooms, a kindergarten and a garbage incinerating plant, the purpose of the latter being to consume all the refuse from the different apartments as quickly as it can be carried to the furnace below. In all suites of whatever size private vestibules and hallways will be arranged, so that access will be given to every room without the necessity of passing through any other with the exception of the living room. The front portion of the roof will be equipped as a roof garden, where two permanent pavilions for shade and protection will be erected, while the rear portion of the roof will be devoted to the drying yards. The number of rooms alloted to each family will run from two and three to four and five apiece. Perhaps the most striking innovation in connection with these new model tenements will be the conspicuous absence of the janitor, who will be superseded by an intelligent and sympathetic matron selected by the trustees, and while practically taking the place of a janitor her duties will differ materially in that she will attend to all the affairs that may be called to her attention, as well as look after the sanitary condition of the buildings. The number of rentable rooms in the entire structure will be 207, arranged in 70 apartments, of which 25 are two-room suites, with toilet and shower bath; 27 are three-room suites, similarly equipped; 14 are four-room suites, with bathrooms containing toilets and tubs, and 4 are five-room suites, with bathrooms. The urgent need of new and model tenements in New York City is apparent to any one who may take the trouble to investigate the conditions as they at present exist in the metropolis, where nearly 400,000 families live in what the law defines as tenement houses.

Exposed Piping Unobjectionable.

A great advance was made in the sanitary equipment of buildings when the former system of hiding every possible pipe was in a large measure overcome. The unseen water service, waste and other pipes in a building not only permitted poor workmanship and bad arrangement of pipes to pass uncondemned but the effort to hide them from view too often provided opportunity for accumulations which, if not actual filth, certainly were nothing of which the housewife could be proud. Modern plumbing equipment, whether to the novice who has lived away

from all examples of the best class of American plumbing or to those acquainted with the plumbing equipments of 20 years ago is far more pleasing in appearance and much more satisfactory than the old systems. Everything in full view, with no inclosure to serve as a receptacle for the undesirable, gives an honest, open appearance which, with excellent workmanship and superior finish of the different lines now available, adds greatly to the attractiveness of this necessary equipment. An English exchange calls attention to the method of protecting hot water service pipes which were run on the outside of a house. While condemning it in practice broadly, the method is illustrated as resulting in overcoming a situation which otherwise would have been very awkward. This is evidence that the best plumbers on the other side of the ocean agree with those here that provision should be made within any new building that is erected for running all the necessary piping in a manner which is neither objectionable in appearance nor inaccessible for repairs. In some fine residences where hard wood floors are laid provision is made to run the water service and waste pipes in a special box or trough lined with sheet lead and covered with a lead faced lid, which is screwed down sufficiently tight to prevent water being splashed through, even though one of the pipes inclosed should burst or leak from any cause. These troughs are located where they are accessible and can be readily opened should occasion require. Provision is made to drain them into some fixture where any leak will be quickly noticed, a sufficient indication that repairs are needed.

Meeting of Massachusetts State Association of Master Builders.

According to programme the annual meeting of the Massachusetts State Association of Master Builders was held in Worcester on Wednesday, November 15, with nearly all the local bodies represented by delegates. A feature of the meeting was the report of Secretary H. W. Sweetser, in which he reviewed the work of the association during the year and referred to the benefits which have been derived from the organization. The Industrial Education Bill, proposed by Governor Douglas in his inaugural, appealed to the needs of the times and its progress has been followed with interest. The hearings of the commission appointed by the Legislature have been attended by members of the builders' association and by a committee appointed to study the problem. Several members of that committee gave a report of the hearings attended by them, quoting statistics from foreign countries showing the rapid growth and development of trade schools and their appreciation by the people, all tending to establish the fact that foreign countries are in advance of our own in this movement. A portion of the convention session was given up to perfecting the constitution and by-laws and completing the articles of incorporation.

The local bodies affiliated with the State Association generally reported a prosperous season. The past year was notably free from strikes, only two being reported, one in Worcester in the early season and a strike of plumbers in Springfield, which is at present in progress. The latter city, which suffered a general strike of carpenters last year, interfering materially with active building operations, has the present year, under the "open shop principle," been exceptionally busy. In Worcester building operations the first part of the year were restricted somewhat, but later assumed a more normal condition, and several large contracts are now in process of completion, with others about to be started. Generally speaking the volume of business for the current year has been about up to expectations.

After adjournment of the association the Executive Board held a meeting and elected the following officers: President, Herder C. Wood of North Adams; first vice-president, Albert B. Murdough of Watertown; second vice-president, John A. Jackson of Brockton; secretary, Henry W. Sweetser of Worcester, and treasurer, Burton C. Fiske of Worcester.

Auditors—Edward J. Cross of Worcester, Robert E. Glancy of Waltham and Francis A. Starr of Fitchburg.

Directors for one year—Thomas B. Gilbert, Springfield; Burton C. Fiske, Worcester, and Kelley W. Handy, Salem.

Directors for two years—George W. Whitney, Milford; Francis F. O'Neill, Holyoke; Herbert M. Gragg, Waltham, and Herder C. Wood, North Adams.

After disposing of several other matters of business it was voted to adjourn to the second Wednesday in December.

Our Supplemental Plates.

Accompanying this issue of the paper our readers will find two half-tone supplemental plates, one of which shows a chapel of attractive design erected not long since on Avon street, Lawrence, Mass., in accordance with plans prepared by Edward Sheehan, with offices in the Tremont Building, Boston.

The other half tone plate carries a picture of a carriage house and stable erected for Colonel Bunting at Swampscott, Mass. This is a rather neat affair and is presented as affording points of suggestive value to those contemplating the erection of buildings of this kind. The architects were Bacon & Hill of Boston.

Convention of Texas Builders' Exchange.

The sixth annual convention of the Texas Builders' Exchange was held in San Antonio, Texas, the last week in November. Many interesting matters were considered, reports were received and a review of the work of the organization during the past year presented. It was decided that in the future the convention be limited to two days and the State Exchange bear the expenses.

The officers elected for the ensuing year were: President, Alex. Watson of Dallas; vice-president, W. N. Hagy of San Antonio; secretary-treasurer, H. C. Opperman of Galveston, and sergeant-at-arms, Fred Hartel of Galveston.

The concluding feature of the convention was a banquet in Beethoven Hall, tendered the delegates and their friends by the local exchange.

Modern Bathtub.

The modern bathtub is an institution that seems to be growing smaller as civilization advances—at least such is the observation of house hunters in the large cities. The impressions of such are well summarized in the views of an English visitor to these shores reported in a recent New York daily: "Trot around and feast your eyes on the building operations throughout the city. In tenement and private residence, in Queen Anne, Elizabeth or Colonial cottage, in gorgeous apartment houses, the bathtub's dimensions are decreasing. Does this indicate that we as a race are growing shorter? Why, many of the tubs are not over 3½ feet long. I went through a $13,000 house in the Bronx the other day and measured the skimpy little tin tub. A baby could not straighten out in it. And the room was about 5 x 7 feet. I wouldn't live in a house of that kind. The bath's the thing, and I'm no British crank on 'tubbing.' Give me a 7-foot tub at the shortest and let me lie in it and soak."

THE Grand Jury of Albany County has at length returned indictments for manslaughter in the second degree against the contractor, John Dyer, Jr., and his superintending architect, Clark L. Daggett, who were in charge of the alterations going on at the department store of the John G. Myers Company in Albany, N. Y., when that building collapsed last August, causing the death of 13 persons and the injury of 30 others.

AN EIGHT-ROOM FRAME HOUSE.

THE house which we illustrate herewith embodies many features of arrangement and architectual treatment likely to prove of suggestive value to the young architect and builder. It will be noted that the frontage is the principal dimension, and that the disposition of the interior space is such as to bring the principal rooms to the front of the house. The stairway is set back so as to throw the reception hall, living room and library into one room if desired and giving to the arrangement a light airy effect. The floor plans and elevation presented herewith give an idea of the general appearance of the design, while the miscellaneous details show the construction and finish employed.

According to the specifications of the architect the foundation walls are faced from the ledge at the grade line to the top of the wall with red face brick laid in red cement mortar. In the framing of the house the girders are 6 x 8 inches; the ledgers are 2 x 4 inches; the posts 8 x 8 inches; the wall plate 4 x 6 inches; the headers 4 x 8 and 4 x 8 inches; the first and second floor joints 2 x 10 inches, placed 16 inches on centers; the studding 2 x 4 inches, also placed 16 inches on centers; the common rafters 2 x 4 inches; the valley rafters 2 x 6 inches and the second story ceiling joists 2 x 8, placed 16 inches on centers. The frame of the building, including roofs, is covered with ⅞ x 8 inch sheathing paper lapped 2 inches, this in turn being covered on the side walls, where shown, with 6-inch Washington cedar shingles exposed 5 inches to the weather. All surfaces so shown on the elevations are covered with 6-inch Washington cedar bevel siding exposed 4½ inches to the weather. The roofs are covered with Washington cedar shingles laid 4½ inches to the weather with open valleys. The basement has a concrete floor composed of 3 inches of grouting finished with a ½-inch top dressing. The steps from grade to the basement floor are of concrete, the concrete being composed of one part cement, three parts sand and five parts stone. The top dressing is of equal parts sand and cement.

The walls and ceilings of the first and second stories are lathed and covered with a coat of wood pulp plaster, which when thoroughly dry was covered with a coat of lime and sand gauged with plaster of Paris, except in the kitchen and bath room, where to a hight of 5 feet the sand finish is omitted and in its place is a coat of Alpine or hard plaster troweled smooth and blocked off in 3 x 6 inch rectangles to represent tiling.

The floor joists of the first and second stories are covered with ⅞ x 8 inch shiplap, the finishing floors being ⅞ x 3½ inch V. G. fir flooring blind nailed at each bearing. All interior finish is select "slash grain" fir, except in the dining-room and bathroom. The former has select "slash grain" hemlock and the bathroom V. G. fir. The dining-room has a paneled wainscoting, as indicated in the details. The Alpine wainscot in the kitchen and bathroom is finished with three coats Rinald Brothers' porcelain enamel paint.

All siding and exterior trimming is painted three coats of white lead and linseed oil and the shingles are treated with Cabot's shingle stain. The porch ceilings and all ceilings under cornices are finished with a clear filler and two coats of spar varnish, while the porch floors have three coats "water proof" floor paint.

All the wood work in the living-room, library and hall has one coat Berry Brothers' weathered oak oil stain and one coat of lack luster. The wood work in the dining-room has one coat of Berry Brothers' clear paste filler, followed with a coat of orange shellac and then two coats of Berry Brothers' white hard oil finish, the last coat being rubbed down with pumice stone and water to a dull finish. The kitchen has one coat orange shellac, sandpapered smooth and followed by two coats of Berry Brothers' white hard oil finish. The pantry and bathroom have two coats of white lead and linseed oil rubbed smooth and one coat of white lead, linseed oil and zinc white. All other wood work in the second story has one coat of white shellac, sandpapered smooth, and two coats of Berry Brothers' white hard oil finish, the first coat

Front Elevation.—Scale, ⅛ Inch to the Foot.

An Eight-Room Frame House.—W. K. Steele, Architect, Seattle, Wash.

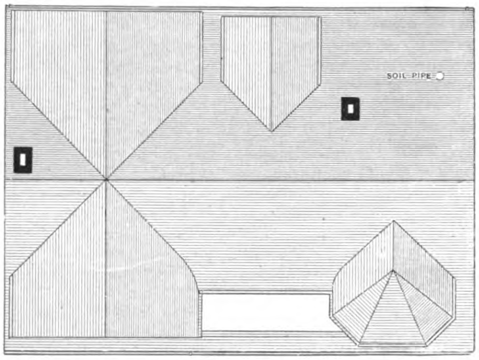
being rubbed with curled hair and the last coat with pumice stone and water.

In the kitchen are two electric bells with gongs of different tone, to ring from push buttons at the front and rear doors respectively. The house is wired complete for electric lighting, there being at the left of the outside door in the main hall one switch for the porch light and a three-way for the main hall light and the upper hall light. A gang in the living room embraces one for each outlet in this room and one each for dining room and library outlets. In the kitchen there is one for the rear porch light and one for a basement light. All wiring is done on porcelain knobs and tubes and all work and material in accordance with the rules of the local underwriters' inspector. All exposed hardware is finished to match the other hardware of the building.

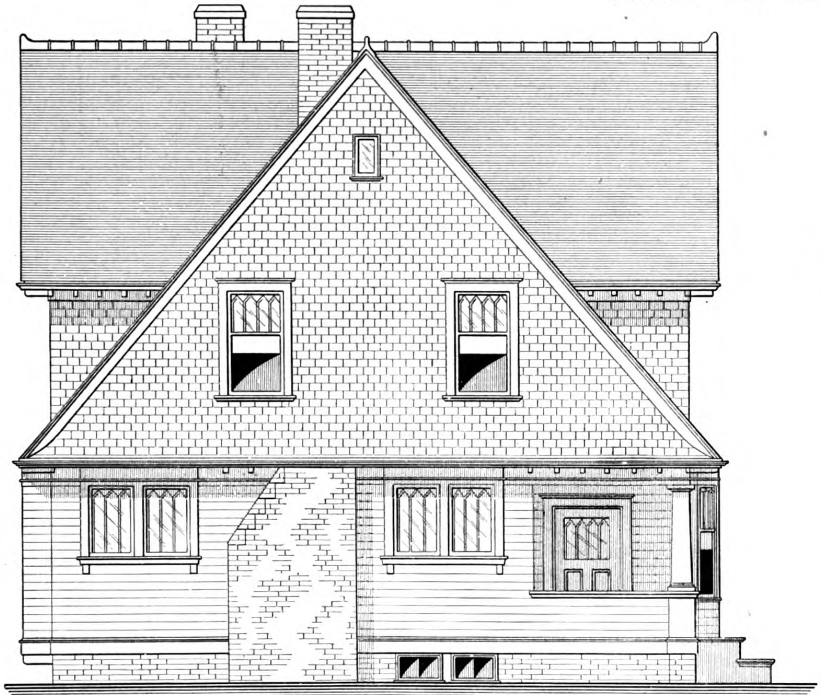
The plumbing, which conforms to the local laws and ordinances, consists of a 5-foot Perfecto bathtub; two Berwick wash basins or lavatories, 22 x 27 inches; an Edux syphonic closet; a set of three laundry trays; an 18 x 30 inch sink and board, and a 40-gallon galvanized iron boiler, each of the Standard Sanitary Mfg. Company's make.

The heating is by means of a 37 Royal furnace, the hot air pipes connecting with black japanned registers. All hot air pipes are covered with one layer of "air-cell" covering.

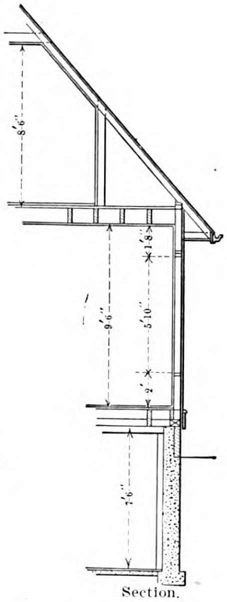
The house here shown was designed by W. K. Steele, 493 Arcade Building, Seattle, Wash.



Roof Plan.—Scale, 1-16 Inch to the Foot.



Side (Left) Elevation.—Scale, ⅛ Inch to the Foot.



Section.

An Eight-Room Frame House.—Elevation Plan and Section.

Convention of Pennsylvania State Association of Builders' Exchanges.

According to programme, the fourth annual convention of the Pennsylvania State Association of Builders' Exchanges was held at the headquarters of the Pittsburgh Builders' Exchange League, in the Heeren Building, on Penn avenue, Pittsburgh, December 5 and 6, a large representation being present. There was an early gathering of delegates from Altoona, Beaver, Bradford, Butler, Chambersburg, Easton, Erie, Harrisburg, Kittanning, New Castle, Oil City, Philadelphia, Pittsburgh, Pittston, Reynoldsville, Scranton, Sharon, Warren, Wilkes-Barre and Williamsport.

The chair was occupied by President R. K. Cochrane and the morning session of December 5 was devoted to organizing and to routine matters. The greater part of the afternoon session was devoted to a consideration of suggestions as to changes in the constitution growing out of the report of the Committee on By-Laws and Constitution.

In the evening the delegates were entertained at a theater party at the Gaiety, the hosts being the Pittsburgh Exchange.

An interesting feature of the second day's proceedings was found in the reports from the various organizations represented showing the great growth of the body and that practically every city of importance was affiliated with the State organization. A resolution was adopted declaring for the "open shop" in all the building trades and also providing for wage agreements to terminate at the end of each year. There were at the final session a

number of most interesting and instructive speeches from leading builders, addresses being made by William H. Hunt, past president of the Builders' Exchange of Cleveland; President John R. Squire of the Ohio State Association of Builders' Exchanges; J. K. Turner, president of the Manufacturers' Information Bureau, Cleveland; James A. Emery, secretary of the Citizens' Industrial Association of the United States; Edward A. Roberts, the well-known secretary of the Cleveland Builders' Exchange, and James E. Carter, secretary of the Buffalo Builders' Exchange and also of the New York State Association of Builders.

The result of the election of officers for the ensuing year was as follows:

President, E. J. Detrick, Pittsburgh.
First Vice-President, C. E. Woodnutt, Williamsport.
Second Vice-President, C. E. Uhdey, Warren.
Secretary, E. S. Williams, Scranton.
Treasurer, William Hanley, Bradford.

The Executive Committee elected consists of William T. Anderson, Sharon; John Rummel, Butler; B. Griffin, Pittston; R. K. Cochrane, Pittsburgh; J. T. Meals, Oil City, and J. E. D. Huffman, Williamsport.

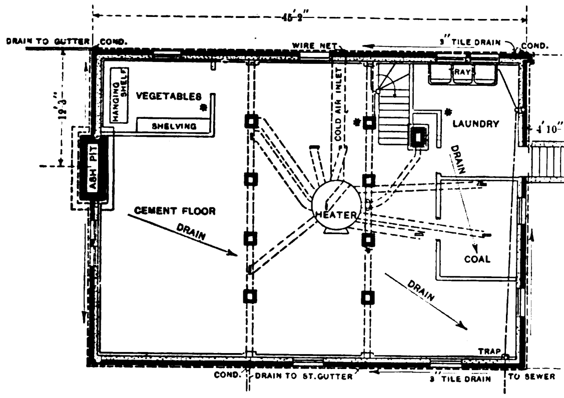
A vote of thanks was extended to the officers who had served during the past year, and it was voted to hold the next annual meeting at Bradford at such time as shall be decided upon by the Executive Committee.

A fitting climax to the second day's proceedings was the banquet at the Monongahela Club, given by the local members of the Builders' Exchange League. Covers were laid for 250 and it was in every way a most enjoyable affair. The toastmaster was Reese Lindsay and the guests were welcomed by William T. Powell of Pittsburgh. James Emery of New York responding. Among the topics discussed after the guests had duly considered the good things set before them were "Good Work and Fair Prices," by Edward Stotz; "The Power of Organization," by James W. Wardrop of the Merchants' and Manufacturers' Association; "The Power of Associated Effort," by C. W. McCormick; "The State Association," by R. K. Cochrane, the retiring president, and "The Builders' Exchange," by President Samuel Francis of the Pittsburgh Builders' Exchange League. The banquet closed with the quartette and guests singing "America."

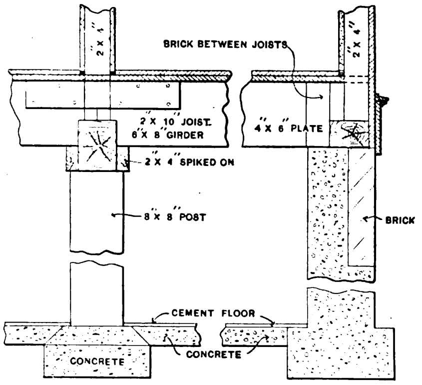
Before the delegates dispersed to their respective cities a group photograph was taken in the convention hall.

A Novel Heating Plant.

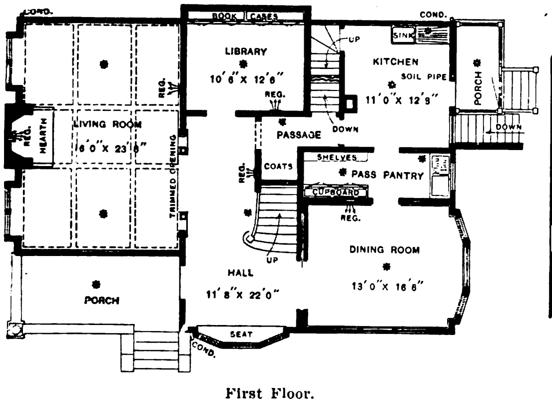
A rather novel heating plant by means of which the air is heated by being drawn over hot water coils by large suction fans is being installed in the extensive car works and shops of the Pittsburgh & Lake Erie Railroad Company at McKees Rocks, a suburb of Pittsburgh, Pa. The water for the coils will be heated in the power house by exhaust steam and a pump will force it through small pipes to the four buildings to be heated, half a mile away. In passing through the coils the heat is reduced about 60 degrees by the cool air passing over them. It is passed back again to the power house after this cooling and reheated, so that a very small amount of water needs to be added. The freight car repair shop is 175 x 400 feet and requires a 240-inch fan. The plant is being also installed in the car and tender shop, the planing mill and the coach shop. The temperature in the freight car repair shop and the planing mill will be maintained at about 60 degrees and in the tender and coach shops at 65 degrees. Part of the work is being done by the American Blower Company and part by the Pittsburgh Stoker & Mfg. Company.



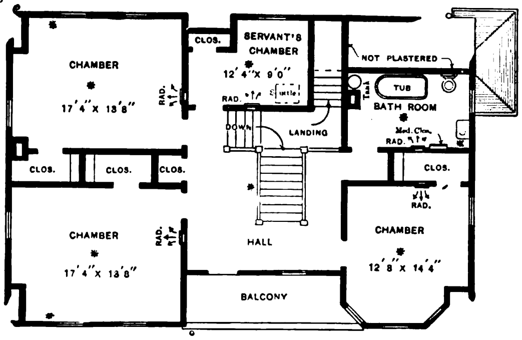
Foundation.



Section through Foundation, Showing Joist Construction.—Scale ½ Inch to the Foot.

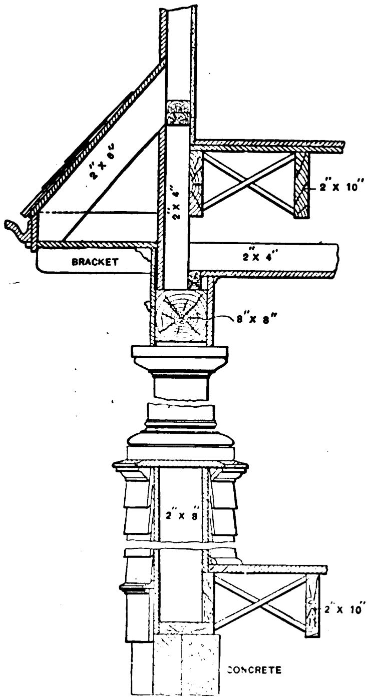


First Floor.

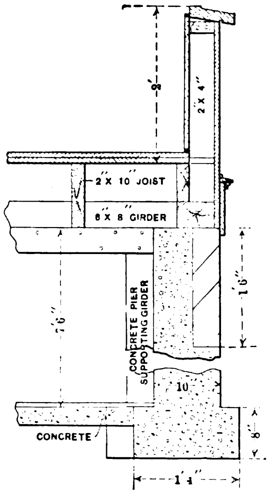


Second Floor.

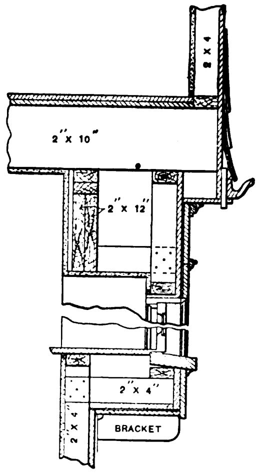
An Eight-Room Frame House.—Floor Plans.—Scale, 1-16 Inch to the Foot.



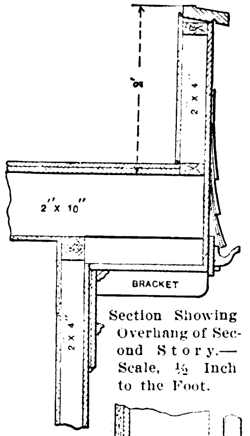
Details of Porch Cornice, Showing Column, Pedestal, &c.—Scale, ½ Inch to the Foot.



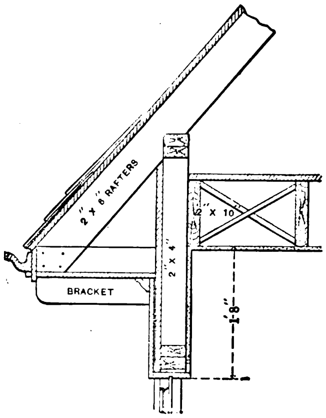
Section through Foundation, Showing Girder Construction.—Scale, ½ Inch to the Foot.



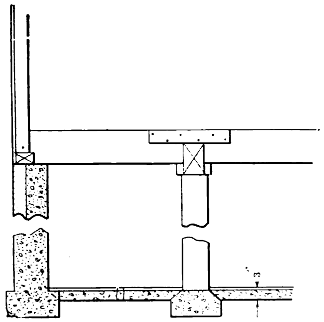
Section through Oriel Window in Living Room.—Scale, ½ Inch to the Foot.



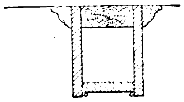
Section Showing Overhang of Second Story.—Scale, ½ Inch to the Foot.



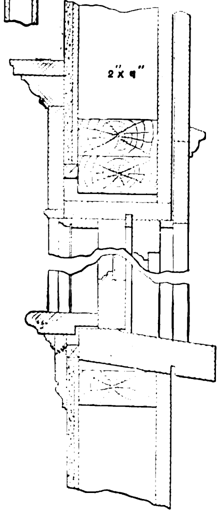
Section of Main Cornice.—Scale, ½ Inch to the Foot.



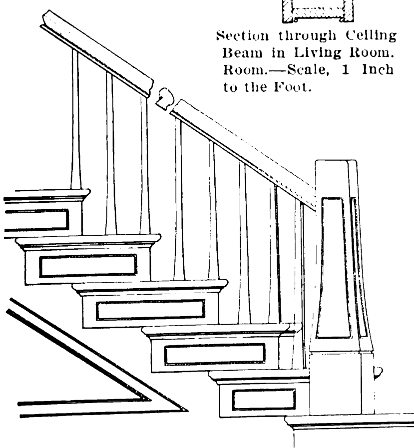
Section through Outside Wall.—Scale, ¼ Inch to the Foot



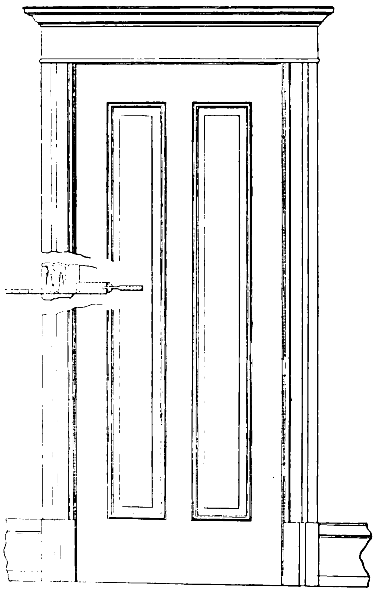
Section through Ceiling Beam in Living Room. Room.—Scale, 1 Inch to the Foot.



Vertical Section through Window Frame.—Scale, 1½ Inches to the Foot.



Detail of Staircase.—Scale, ½ Inch to the Foot.



Details of Inside Doors and Trim.—Scale, ½ Inch to the Foot.

Miscellaneous Constructive Details of an Eight-Room Frame House.

LAYING AND FINISHING HARDWOOD FLOORS.*

By Frank G. Odell.

THE frequent inquiries in the Correspondence columns of *Carpentry and Building* indicate that there is a dearth of knowledge as to the proper method of sharpening a scraper. Without any disposition to assume superior knowledge in this connection I am constrained to remember that we cannot clean our floor without sharp tools, and will give your readers the benefit of my experience along this line.

I presume that every reader understands that the cutting edge of the scraper is formed by turning over a "burr" or wire edge, which does the cutting when applied to the wood. This burr is made by rubbing against the edge of the scraper with a tool called a burnisher, which may be made of any piece of steel of convenient form but which must be harder than the scraper. A common method is to grind a file down until a perfectly smooth surface is secured with the corners slightly rounded and the tool set in a convenient handle. A simpler and much better method is to grind a smooth point on a discarded nail set and mount it in a handle, like the burnisher illustrated. Do not forget to put a point on it and make it sharp.

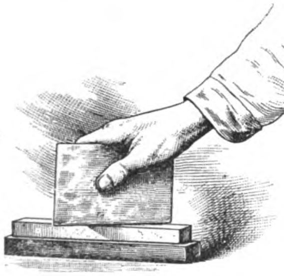


Fig. 7.—Position of Scraper on Oilstone.


Fig. 8.—The Scraper Laid Flat on Oilstone.


Fig. 9.—Turning the Edge.

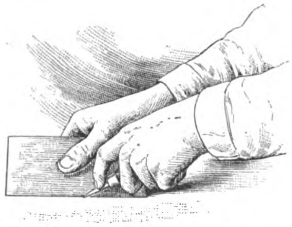


Fig. 10.—Pointing Out the Edge.


Fig. 11.—Rubbing Out the "Burr."

Laying and Finishing Hardwood Floors.

Whether the edge of your scraper should be square or beveled will depend on the class of work you have to do. If it is fine bench work on very hard wood and you wish the finest possible finish use a square edge and turn the burr on your scraper for a light shaving. If you are on a floor or other work where fast cutting is required and plenty of sandpaper will follow use a beveled edge and have plenty of steel back of the edge to hold it firm.

Whether you file or grind your scraper will depend largely on the temper of your steel and your own disposition. In either case you will have to whet the edge smooth on an oil stone before a satisfactory cutting edge can be obtained. Now don't forget that to have a scraper cut well it must have an edge as smooth as any other edged tool used for fine work and this edge can only be obtained on the oil stone.

If you are using the common cabinet scraper and the class of work will permit, the square edge will be desirable, inasmuch as you can secure eight cutting edges and avoid frequent sharpening.

Let us suppose that we have ground or filed a straight and smooth edge on our scraper, then put it on the oil stone.

After you have rubbed down a pretty smooth edge turn the scraper down flatwise on the stone and take off the wire edge.

Repeat these operations with every cutting face of your scraper until you have a corner as smooth and sharp as you would put on a smooth plane. Having reached this point we are ready for the burnisher.

Now set your scraper firmly on the bench and hold it in position with your sinister hand while the dexter one grips the burnisher and with a stout upward pull against the corner turn the edge.

Better protect that sinister hand with a bunch of shavings or something else, for the edge is likely to cut your hand if the oil stone has done its duty.

You will now find that there is a little hooked edge turned over on your scraper if you have made a hard and steady pull with the burnisher. To make sure that this edge will be perfectly smooth turn the scraper down on the bench at an angle and "point out the edge."

Here is where that sharp point comes handy on the burnisher. Incidentally, it is useful for starting screws, marking keyholes, in fitting locks, &c., but indispensable as a sharpener for the scraper. Be careful to put the point exactly in the angle where the little burr turns over the edge of the scraper and ever so lightly and carefully draw it along the whole length of the angle to smooth up the cutting edge of the burr, then more lightly than at first turn the edge again with a single stroke of the burnisher.

If you have been happy in following these poor instructions you will now have an edge which will cut a shaving as fine as silk and as fast as you can pull the tool. Presently it will get dull. This will be largely caused by the gathering of fine particles of dust in the angle of the burr if your wood be free from sand or grit, so take your burnisher and carefully "point out" again and turn the edge lightly afterward. You will be surprised, if not familiar with this method, to see how long the tool holds its edge without sharpening, but don't forget that everything depends on the oil stone to begin with.

After this operation has been repeated two or three times the scraper will really become dull and the pointing out process fail to work. Then turn the tool flat

---

* Continued from page 341, December issue.

down on the bench and with the burnisher rub the edge smooth.

A few brisk strokes of the burnisher will turn back the burr and the edge will be observed to be more or less full of imperfections. If not too badly worn and the steel be of good temper you may return to the oil stone and again smooth up the edge and repeat the processes of turning, pointing out and finally turning the cutting edge.

Having our tools all well in order and possibly a trifle in advance of the time of need we will proceed to the preparation and laying of the floor.

Laying the Floor.

In considering this portion of our topic much depends on whether the surface to be covered is in a new or an old building. If in the latter we must prepare the surface of the old floor with considerable care, bearing in mind the thickness of our new floor and the finished results to be attained. Should the new floor be seven-eighths in thickness the treatment will be comparatively simple, as inequalities in the surface of the old floor may be remedied by judicious use of "furring" strips of varying thickness placed not more than 16 inches on centers. A large portion of the work which comes to experienced floor finishers is of this character and the old floors are nearly always in a state which requires considerable preliminary work in leveling up before the work of laying the new floor can be begun.

In new buildings the general custom is now to lay a floor lining of common boards when the building is inclosed, and in any case it is well to carefully level up the floor lining and cover with building paper before starting the new floor. Wherever practicable the use of "furring" strips between the floors is recommended. In ordinary cases nothing is better for this purpose than common plastering lath. These can always be used to advantage where the finish floor is seven-eighths thick, as the floor lays easier and an air space is preserved between the floor and lining, adding materially to the warmth of the finished building.

In laying floors in an old building we are frequently confronted with a floor which is so badly out of level as to render necessary the taking up of a portion of it and relaying before a surface can be obtained sufficiently level to receive the new floor. This is particularly true in laying the thin sort of hardwood flooring now so popular. This material is milled for three-eighths thick and usually runs about five-sixteenths in thickness, rendering it absolutely necessary to have a solid underlining for the entire new floor to rest upon. It is highly important that the under surface be sufficiently level and smooth to prevent creaking of the finished floor. The apparent necessities of the case commend the free use of building paper, which is inexpensive and serves to cushion over many little inequalities and render the finishing much easier of accomplishment.

All these little necessities should be carefully considered in estimating the job and the owner be given to understand that the cost of laying a new floor is not always minimized by the presence of a comparatively good old floor over which to lay the new one.

Floors in New Buildings.

If the building be new and the rough floor be warped by the dampness incident to plastering be sure to level off all uneven joints before starting the new floor. Much of this trouble may be avoided by using a good quality of shiplap boards for the rough floor and using cement coated or "box" nails for the nailing. Drive the nails not more than ½ inch from the edge, drawing up the heads well, and warping will cause little trouble.

Should the necessities of the case require the laying of the floor before plastering be sure and cover it with a double thickness of building paper before the plasterers arrive, and charge up in your estimate an additional 50 per cent. for the extra cost of finishing the floor because of the sand which will get into the surface.

If there is a large quantity of floor to be finished it will always pay to lay a rough floor for purposes of construction and not bring the finish floor into the building until all other craftsmen have departed.

The finish floor, whether of pine or hard wood, should be kiln dried for at least ten days before laying, if a dry kiln be accessible and not brought into the building until all plaster is perfectly dry. Nothing is so trying to a floor as the superheated atmosphere of the modern residence. Do not allow your lumber dealer to persuade you that the floor is "dry enough" or that it "was kiln dried when he bought it." Ordinary shed storage in a lumber yard for two weeks will put sufficient moisture in the material to render the results quite unsatisfactory after the heat has been turned on for a while.

Five or ten dollars will cover all additional expense for drying and hauling for the floors for the average residence, and any sensible property owner will cheerfully pay this small additional cost if he understands the benefits to be derived in superior wearing qualities and finish. It sometimes happens that a customer wants a new floor in a hurry, but insist on two weeks' time to dry your material, for it will pay you and your client.

Experience demonstrates that a newly scraped floor is liable to damage from careless feet; that it is advisable to defer laying the finish floor until all other work is done so far as possible, finishing a room at a time and barring all entrance thereto until the painter has completed his work. If this rule can be adhered to it will save much grief and expense to the contractor.

It is our custom in finishing floors to put all trim in place and let the painter finish his work up to the last coat before laying the floor, leaving the painter in sole possession and responsible for the care of the floor after the carpenters leave. If this is not done the owner or some chance visitor may track up your floor and cause untold trouble and expense. Lock all doors and admit no visitors if you would save your floors from damage.

Selecting the Flooring.

In selecting flooring do not forget that every peculiarity of the surface will be accentuated by the finish. What may appear to be comparatively small defects in the board will be glaring blemishes in the finished floor. Look out for sap streaks, pitch pockets, knots and defective milling. It frequently happens that careless machine work will leave the end of the board a little nardow. This is particularly common in yellow pine flooring coming from Southern mills. Constant scrutiny is necessary to prevent the creeping in of such defects.

It should be the business of one man to select and match up the floor as to grain and color, and this man should thoroughly understand his business. If there be nine rooms with a perfect surface and one with a blemish as big as a dime the owner will find that blemish and put his finger on it to your discomfort before he sees any of the nine perfect rooms. The moral of this is that the way to avoid criticism is to make criticism impossible from any reasonable point of view.

In selecting Southern pine flooring (and nothing is more beautiful and durable if properly handled) choose the quarter sawed stock, giving preference to the harder boards with narrow and even grain. Soft boards or flat grain do not finish as smoothly or wear as well. A most beautiful variety of color and grain can be secured in the Southern pines and a pleasing contrast is secured by using this floor in rooms finished in darker woods.

It should not be necessary to caution the carpenter about two elementary things, viz., avoid hammer marks on the edge of the floor and use up your pieces as you go along. Yet these two points require constant watchfulness. Pieces may be easily used up as they are made and prevent wasteful accumulation without detriment to the finished results. If the rough floor be stripped with lath the board may be cut full length regardless of the location of the joist and a bit of lath slipped under the joint, the piece left at the end being carried back to start the next run of boards. By pursuing this plan all joints except the final one may be cut as the boards lie on saw horses, greatly expediting the work, and there will be no pieces left to go into the scrap pile when the floor is laid.

These suggestions may appear unimportant or superfluous, but it will be found that due heed to "short cuts" of this sort makes a material difference in the percentage of profit.

Nearly all hardwood flooring is now end matched, making it possible to use up short lengths with great economy of labor, and it is also bored for nailing. The boring, which goes about a fourth of the way through the board on the tongue edge, greatly expedites the nailing, and in the harder woods avoids the damage caused by bending nails or splitting of the board.

A special flooring nail is now made in gauge of wire about the weight of an 8d. common and in length and style of head like a 10d. casing, and with numerous small transverse corrugation, or crimps, which serve to give it a firm grip and considerable drawing tension when driven up. In appearance it is about like the 10d. casing but of a heavier gauge of wire. This nail can be purchased in quantity at about the same price as the ordinary nail, and will be found very serviceable for its special use.

In laying thin floor use 1½-inch No. 16 wire brads, face nailing both edges every 12 inches and sinking the nail heads with a fine nail set. Ordinary blind nailing will not keep thin floor from warping or creaking. If the filler is properly applied the small holes made by the nail heads will be filled up.

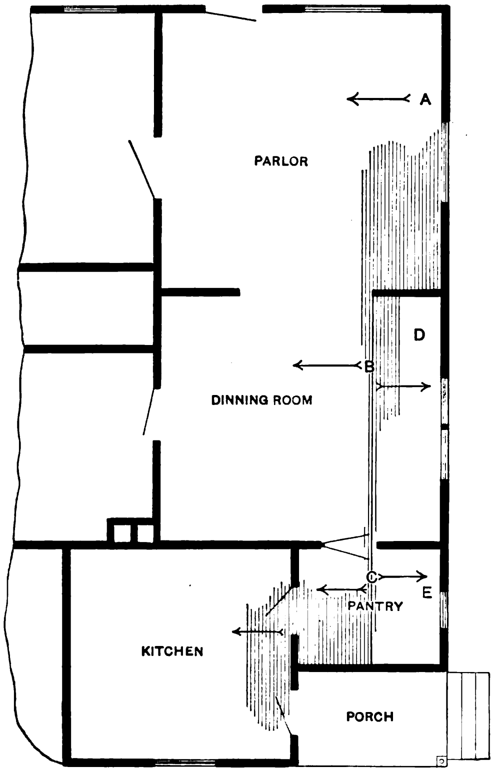


Fig. 12.—Partial Plan, Showing Method of Joining Floors in Adjacent Rooms.

Laying and Finishing Hardwood Floors.

Difficulty is often experienced in making the floor in two or more adjacent rooms line up properly through connecting doorways, but this difficulty may be avoided by pursuing the following simple plan. Referring to Fig. 12, which represents a partial plan of the main floor of a dwelling, the floor may be started at any convenient point, as A, where the largest possible surface can be laid in a given direction. Continue in regular manner through the connecting openings into the adjacent rooms, being careful to keep the boards lined straight. The unfilled back portion may then be laid by inserting a loose tongue made of a thin strip as at B and C and laying the remainder of the floor in the opposite direction. The joining should be well face nailed and if the floor be laid on strips the joining should be underlaid with a strip placed lengthwise to reinforce the loose tongue.

It will be observed that in the plan, Fig. 12, the larger portion of the floor in the entire house can be laid in the same direction. A little careful planning will enable one to get out of troubles of this kind easily. I have occasionally seen attempts to start at relative points in the adjacent rooms, as at A, D, and E, laying the floor in the same direction and trusting to good measurement and good luck to line up properly at B and C. The natural variation in driving up the boards and difference in width will generally give quite unsatisfactory results when this plan is followed, to say nothing of the additional time consumed, all of which may be obviated by the use of the method indicated.

The only apology for the suggestion of these very simple and elementary methods is that they tend to increase the element of profit and to counteract in some degree the apparently natural tendency on the part of many good mechanics to take the longest and most difficult way to accomplish a given end.

(*To be continued.*)

Mediaeval Chimneys.

That there were no chimneys in the tenth, twelfth and thirteenth centuries seems to be proved by the so-called ignitegium or pyritegium, the curfew bell of the English and *couvre feu* of the French. In the Middle Ages, as they are termed, people made fires in their houses in a hole or pit in the center of the floor under an opening formed in the roof, and when the fire was burnt out or the family went to bed at night the hole was shut by a cover of wood. In those periods, says a writer in an English exchange, a law was almost everywhere established that the fire should be extinguished at a certain time in the evening, that the cover should be put over the fire place and that all the family should retire to rest, or at least be at home. The time when this ought to be done was signified by the ringing of a bell. William the Conqueror introduced this law into England in the year 1068 and fixed the ignitegium at 7 in the evening in order to prevent nocturnal assemblies, but this law was abolished by Henry I in 1100. The ringing of the curfew bell gave rise also to the prayer bell, as it was called. Pope John XXIII with a view to avert certain apprehended misfortunes which rendered his life uncomfortable, gave orders that every person on hearing the ignitegium should repeat the Ave Maria three times. When the appearance of a comet and a dread of the Turks afterward alarmed all Christendom Pope Calixtus III increased these periodical times of prayer by ordering the prayer bell to be rung also at noon.

The oldest certain account of chimneys occurs in the year 1347, for an inscription which is still existing or did exist at Venice relates that at the above period a great many chimneys (*molti camini*) were thrown down by an earthquake. This circumstance is confirmed by John Villani, the historian, who died at Florence in 1348 and who calls the chimneys *fumajuoli*. Galeazzo Gataro, who in the "Dictionary of Learned Men" is named De Gataris and died of the plague in 1405, says in his "History of Padua," which was afterward improved and published by his son Andrew, that Francesco da Carraro, Lord of Padua, came to Rome in the year 1368 and finding no chimneys in the hotel where he lodged, because at that time fire was kindled in a hole in the middle of the floor, he caused two chimneys like those which had been long used at Padua to be constructed and arched by masons and carpenters whom he had brought along with him. Over these chimneys, the first ever seen at Rome, he affixed his arms, which were still remaining in the time of Gataro.

◆

THE house in Verona in which Juliet is said to have lived and in which she received Romeo has been sold at auction.

Some Suggestions Regarding Porches.

The subject of porches in connection with dwelling house construction is one of no little interest to architects and builders, and while to many the matter may appear of slight importance, yet on the proper style, design and proportions of the porch depend much of the beauty of the home. That the subject is susceptible of treatment in a way to prove of suggestive value is demonstrated in a chapter on porches contained in a serial article on "Planning the Home" running in "The House Beautiful," and contributed by Robert C. Spencer, Jr., a well-known architect of Chicago. The matter is of such obvious interest to many of our readers that we take space for the following extracts:

The word "porch" is generally used in America as a generic name for every sort of external floored and roofed space connected with a house. "Veranda" and "piazza" are commonly used with similar meanings, and since our latest revival of the Renaissance, we have "loggias," "pergolas" and "terraces" galore—with more or less justification for their being. For the sake of simplicity we will use the common vernacular as long as it will serve our purpose, which is to point out wherein we succeed and wherein we fail as porch builders.

Porches serve two quite different uses: As sheltered entrances and as outdoor rooms. It is possible sometimes to quite successfully combine these two functions, but we seldom succeed. Privacy from intrusion demands a porch away from the principal entrance, or at least from a much frequented entrance.

There are thousands of good people in our cities and more crowded suburbs who seem to have no desire for privacy; they appear upon their front entrance steps with rugs and cushions on summer evenings, and seat themselves within a few feet of the sidewalk. Of course we can all accustom ourselves to the most strange and outlandish habits, and the very Americans who would shrink from one of these front step soirees return from a first sojourn in Paris enthusiastic over the boulevard cafés and their outdoor pavement annexes.

No feature of house planning is causing more controversy between architects and clients than the porch. Many demand that a house shall be buried in porches. The prospect of getting away from the front steps of a city residence to a roomy place in the suburbs or country leads often to absurd extremes in porch building. Many homes are thus denied the precious sunshine during the whole year in the main rooms of the ground floor, and are thus rendered unsanitary, if not cheerless and gloomy, during eight or nine months of the year in our Northern States.

In California or Florida there is some practical reason for the porches which surround so many homes. Yet even these are not entirely right, for there is more real discomfort from indoor chill and damp in the South than in the North. Heating devices are usually primitive and cold waves come with many a wet and dismal day. When the sun again appears it should have a fair chance to enter these houses and purify them.

A porch to be livable must be at least as large as a good sized room and similar in proportions. Its least dimensions should be 9 or 10 feet, even for a small house. If on the west front its long axis should lie east and west. On east fronts, whether facing street or garden, open porches or paved terraces are less expensive and more airy than roofed spaces, and being in the shade of the house all afternoon are comfortable during the hours when the average housewife is at leisure for reading or sewing. As a rule it is not best to build a porch darkening all the south windows of a living room, unless the sun is free to enter from both east and west.

A modern luxury, which is becoming a necessity to many in our insect ridden country, is the porch entirely inclosed with wire screens, and frequently used as a sort of outdoor breakfast room. Given a southern exposure, such porches may be glazed in winter for the housing of tender or half hardy plants, in which case a radiator which can be uncoupled and removed in summer is desirable for maintaining an even temperature.

In seashore or country houses which are seldom used in winter, the two-storied porch is often a delightful feature, the "upper deck," so to speak, serving as an outdoor sleeping apartment in sultry weather and always as a retreat for a quiet afternoon nap.

For comfortable shelter and for practical use a porch should not be too high. The lofty pillared porches of the more grandiose colonial houses and their modern copies are a poor defense against either sun or rain, and therefore as a rule bad architecture.

A carriage porch is a comfortable, although seldom an absolutely essential, adjunct to a large house, the proper location and designing of which requires careful study. If possible it should be connected with an entrance of its own, separate from the principal doorway.

In a long house, where the site indicates a drive with a carriage turn or fore-court away from the line of approach from the highway, the problem is simple, the carriage entrance naturally being opposite the main entrance.

In a rather square house it can be easily arranged at one end. Where privacy on the farther side of a long house is desirable, both entrances should be arranged on the approach side.

The present tendency among architects, however, is to omit the carriage porch entirely, even in the largest country houses. Often the only shelter provided is a small porch, or hood, or a marquise of metal and glass over the doorway.

A good porch should be as strong and permanent in appearance as the house of which it is properly an integral part, although too seldom so designed.

The common type of porch permanently excludes needed sunlight from an entire room and seldom looks well, giving, as usually handled, a lop-sided appearance and masking unpleasantly the strong architectural lines of the corner of the building.

The most satisfactory type of porch as a nondisturbing element in the general composition of a house is roofed by the floor above, and offers the best method of gaining more bedroom space.

Flat hoods or canopies go with quiet, horizontal lines. Hip roofed hoods and the curved canopy forms are often agreeable, the former to harmonize with main roof of similar type, the latter to relieve the monotony of straight lines and hard, square forms, and to accentuate an entrance, and whatever type or types you may choose remember that no porch gives its full measure of comfort and beauty until vines have clambered over it with leaf and bloom, dealing kindly with the mistakes of the architect or enhancing the beauty of his work.

An Important Legal Decision.

A decision on an arbitrary demand made upon Norcross Brothers Company, contractors, by the Bricklayers' Benevolent and Protective Union No. 3 of Boston has been given by a court there. The contracting firm is building the Harvard Medical School and had the work on the flat arches over the windows and doors done on machines. The business agent of the union insisted that the work of cutting and shaping the brick and making and setting the arches was bricklayers' work and belonged to members of the union. He notified the firm that unless the arches were taken out and union men allowed to make and set new arches he would call a strike on other buildings Norcross Brothers Company had under way. On the refusal of this demand the strikes were called. An injunction was sought and the court granted an order restraining the business agent and all officers and members of the union from combining or conspiring to call a strike for the purpose of compelling the contractors to give up the use of machinery or to remove any arches. The order also forbade interfering by force, threats or intimidation with men desiring to remain in the service of the contractors, or combining or conspiring to interfere by force, threats or intimidation with the management of the contractors' business.

◆

Mayor McClellan of New York City has vetoed the ordinance recently passed by the Board of Aldermen doing away with "fire proofed" wood in high buildings.

FORMS OF CONCRETE REINFORCEMENT.

THE use of steel in connection with concrete for building purposes of every description is becoming so widespread that a discussion of the forms of metal most widely used for reinforcement in connection with concrete may not be out of place at this time. The oldest application of reinforced concrete was a boat with sides 1½ inches thick exhibited by Lamont, its builder at the Paris Exposition of 1855. The boat was formed from a wire network with concrete reinforcement. It is said that it is still in use in the park of the City of Miraval, in central France. Francois Monier was granted patents covering practically all the uses to which armored concrete is put to-day, as his patent covered broadly the use of steel reinforcement and concrete and his application was accompanied by hundreds of drawings showing varied forms of combination and application. So broad were his patents that for a time all other applications in European countries were denied. But the Monier patents were later voided when it was proved that some one else had been in the field before him.

Ten years later Thaddeus Hyatt of New York engaged in concrete construction. In the early eighties E. L. Ransome gave concrete steel construction an impetus in this country by building a number of large structures from it. But the largest factor in the world-wide adoption of the armored concrete was Francois Hennebique of Paris, who erected and licensed other engineers to erect probably 10,000 different structures in all parts of the world, but mainly in France and Germany.

Fig. 1.—General View of What is Known as the Johnson Bar.

Fig. 2.—Twisted Bar Used in the Ransome System.

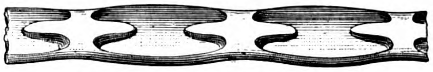


Fig. 3.—Section of the Thatcher Bar.

Forms of Concrete Reinforcement.

The original method of utilizing steel to give tensile strength to the concrete structure was to use ordinary round, square or flat steel bars imbedded in concrete. The earliest application in America of steel reinforced concrete in a large way was in the construction of tanks for grain elevators, malt houses and similar purposes. From this field the use of the reinforced concrete has rapidly widened until to-day concrete engineering has become one of the important branches of technical effort, and concrete steel is admitted to competition with every other form of construction and material for almost every class of structure.

Very naturally the use of the plain steel rod suggested to engineers an improvement in the way of using a corrugated, roughened or otherwise deformed rod which should present larger surface of contact with the concrete and should form a mechanical bond with the concrete which should in a measure be independent of the first factor of cohesion. This idea has found its development in a large number of special forms of bars, rods or meshes, for each of which very positive claims are made by parties in interest. It is not the purpose of this article to enter into a discussion of the comparative merits of these several forms, but rather to briefly describe their characteristics.

Authorities differ as to the breadth of the field in which concrete construction can compete in price with timber. C. A. P. Turner of Minneapolis, member of the American Society of Mechanical Engineers, in a recent address delivered before the Minneapolis convention of engineers stated as his conclusions that for large buildings in which a working load of 500 pounds to the square foot or greater was to be met concrete steel construction could compete with timber on even terms; that for buildings where stresses greater than 800 pounds were encountered it was cheaper than timber and that for smaller buildings, where lighter than 500-pound loads were encountered, the concrete construction would compete with other forms of fire proof construction; in other words, that for large buildings with heavy loads concrete steel had a standing in court independent of its fire proof qualities and that for lighter structures its advantage lay in its resistance to fire rather than in its first cost. Mr. Mensch believes that, except where patented forms of steel are used, the concrete engineer can compete in first cost with timber for structures whose loads are as low as 200 pounds to the square foot and that the results would be more satisfactory and economical to the owner.

In general the armored concrete construction competes with timber and masonry more than it does with structural steel. Its advantage over masonry, aside from any saving in cost of construction, lies in the fact that the thinner walls permitted by it increase the interior floor space materially and decrease the weight and necessary footing for the structure. Its advantages over timber, as for instance in "mill construction," lie in its greater resistance to fire and the economy in space and materials accomplished by the thinner flooring and transverse members.

In comparison with the skeleton structural steel form of construction concrete steel is less injured by intense heats than the more exposed steel of the skeleton structure, as was illustrated in the Baltimore fire. For the same reason it is claimed to be more durable because the steel imbedded in the artificial stone is protected against corrosion due to moisture and other attacking agents. Greater durability than structural steel construction is also claimed because crystallization of steel and shearing of rivets due to vibrating stresses are avoided.

At the outset, in any discussion of the use of steel in connection with concrete, one encounters two schools whose dividing line may be said to be the carbon component of steel used. One school, following the leadership of Considere, the French authority, insists that the factor of tensile strength in a concrete steel structure can be figured no higher than the tensile strength of the steel itself after the steel is stressed to its elastic limit and that therefore the only means for securing the tensile as well as the compressive strength of concrete in connection with steel reinforcement is to use a high carbon steel whose elastic limit is very high. The other school, comprising makers of various systems of expanded metal fabric and soft steel bars of various forms, expresses a preference for the soft steel because its greater ductility will permit its manufacture into special forms for which advantages are claimed which could not be fabricated from high carbon steel. In this connection brief reference to special forms of steel is of interest.

The Johnson Bar.

As will be seen from an examination of Fig. 1 the Johnson bar, the manufacture of which is controlled by the St. Louis Expanded Metal Fire Proofing Company, St. Louis, Mo., is approximately square in section and of practically uniform area, the ribs not being waste, as in

earlier forms. This result is accomplished by rolling the bar on the diagonal and cutting in each roll ribs slightly wider than the spaces opposite which they come. The bar is made from high carbon steel with high tensile strength and elastic limit. The ribs on these bars have faces nearly at right angles to the axis of the bar, varying therefrom an amount not exceeding the angle of friction between concrete and metal, which condition is held to be essential in order that full efficiency of the reinforcement may be developed when the adhesion becomes weakened, which it has been shown may happen in many ways. It is further held as an advantage peculiar to this bar that cracks in the concrete cannot penetrate to the bar as long as the elastic limit in the latter is not exceeded. This bar is widely used in the construction of manufacturing buildings, railway bridges and other structures where heavy loads and vibration stresses are present.

The Ransome System.

This system is based on the use of a twisted bar, shown in Fig. 2, the bar being made of very high or very low carbon steel, as circumstances may determine. Recent experiments have shown that the twisting may be done cold even where a steel as high as 50 carbon is employed. The bar is twisted primarily in order to present a continuous mechanical bond rather than a bond that is effective only at intervals. Its makers, the Ransome Concrete Company, New York, states also that the twisting increases the elastic limit 50 per cent., while the ultimate strength shows an increase of 35 per cent. This bar is made in sizes varying by quarter inches from ¼ to 2 inch diameters, the safe tensile strength of the ½-inch size being given at 2½ tons, the 1-inch size 10 tons and the 2-inch size 40 tons. It is in very extensive use all over the country.

The Thacher Bar.

This bar, as will be seen from a study of Fig. 3, consists of an undulating beaded or bulbed bar, both the undulation and the beads serving as mechanical bonds with the concrete. The beads are placed at the smallest cross-section, reinforcing the bar at that point, making its sectional area and strength, according to the tests of the company, uniform at any point in the bar. Attention is called to the fact that all changes of sections are made by gradual curves, avoiding sharp corners, fins, knife edges and other sudden changes of form, as it is claimed that sharp corners are likely to cause cracks and are therefore not desirable. These bars, which are round rather than square in theoretical section, are furnished in from ¼ to 2 inch diameters. Originally ordinary round bars were run through special rolls that gave them the bulbed form, but the Concrete Steel Engineering Company, maker of the bars, has recently arranged to have them rolled special at a rolling mill.

The same company controls what is known as the Melan system, named after Professor Melan of Vienna, which is in a general way a concrete reinforcement of a structural steel building or bridge in such a way that resistance to compression stresses is aided by the concrete, greatly reducing the tonnage of steel required.

Fig. 4.—General View and Cross Section of the Kahn Bar.

Fig. 5.—The Trus-Con Bar.

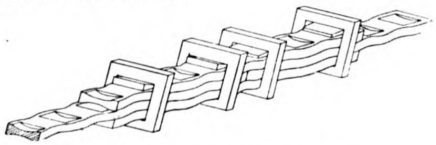


Fig. 7.—The "Universal" Splice.

Fig. 6.—The "Universal" Bar.

Fig. 8.—The Mensch Corrugated Bar.

Forms of Concrete Reinforcement.

The Kahn Bar.

We show in Fig. 4 a general view and cross section of the Kahn bar. It will be seen that it consists of a square bar with projecting flanges sheared at intervals in such a way as to permit the wings or fins to be bent up at an angle of about 45 degrees from the base. These fins act as a half truss, the concrete itself in which the bar is embedded acting as the other half, forming a complete truss. The object of this particular form of bar is to produce a steel half truss which, when embedded in concrete, will relieve the concrete of all tension stresses. Thus a combination of the two is held to form a perfect and ideal structure both theoretically and practically. In other words, instead of using plain horizontal rods in connection with loose vertical stirrups, as is the general European practice to-day (Hennebique system), the two are combined in one bar. The Kahn system of reinforcement is controlled by the Trussed Concrete Steel Company, Detroit.

An advantage claimed for this bar over other forms of reinforcing steel is that diagonal or shear members are produced from that portion of the steel which is not necessary for direct tension and which in other forms of reinforcing steel is claimed to be wasted. In practice the maximum shear occurs at the ends of the beam and the majority of the shear members are placed there, and at the center the bar is left unsheared in order that the full section may resist the tension. When placed in beams or other structures these bars may be so combined by various sizes of diagonals, lengths, &c., as to form a perfect distribution of metal. The steel used in the manufacture of these bars is open hearth and varies in ultimate tensile strength from 60,000 to 70,000 pounds. With an ultimate elongation of 20 per cent. to 25 per cent. the elastic limit remains in the neighborhood of 35,000 pounds. The makers emphasize as one of the important advantages of the trussed bar their claim that satisfactory results may be obtained in this bar without the use of a high carbon steel, such as has been necessary with other systems of reinforcing material. The action of this bar, they say, is so different from plain horizontal reinforcement that high carbon is not necessary.

The "Trus-Con" Bar.

The same firm makes and uses what it styles the "Trus-Con" bar, illustrated in Fig. 5. This bar is composed of an open hearth steel rod upon which is rigidly fastened at regular spaces round or square washers which are slipped on the bar cold. These are so fastened to the bar as not to reduce the section at that point. Approximately 10,000 tons of steel are used annually in these two systems.

The Universal Bar.

One of the latest forms of bar used in concrete reenforcement is the "Universal," shown in Fig. 6. The cross section of this bar is that of an oblong rectangle and in this form lies one of its distinctive features, be-

cause of the large surface area exposed to the concrete. Adhesion is also greatly increased by recesses or pockets rolled into the bar at regular intervals which receive the concrete, guarding against slipping. The Universal bar is rolled from high carbon steel having an elastic limit of from 50,000 to 60,000 pounds per square inch on an 11-pass mill built specially for the work. Sections are rolled up to 60 and 65 feet long, where desired for the construction of long members. The same concern, the Rogers-Hall Company, Warren, Pa., also makes what is known as the Universal splice, shown in Fig. 7, which consists of the two bars to be connected, two splice bars of short lengths, four clamps, four wedges and a number of small elliptical forgings having the form of the pockets in the Universal bar. The ends of the bars are lapped over several recesses, the forgings are slipped into the recesses and the whole thing is clamped together with the square washers and small wedges which are driven between the washers and the bar. By means of this splice the steel re-enforcement can be made practically continuous for any length.

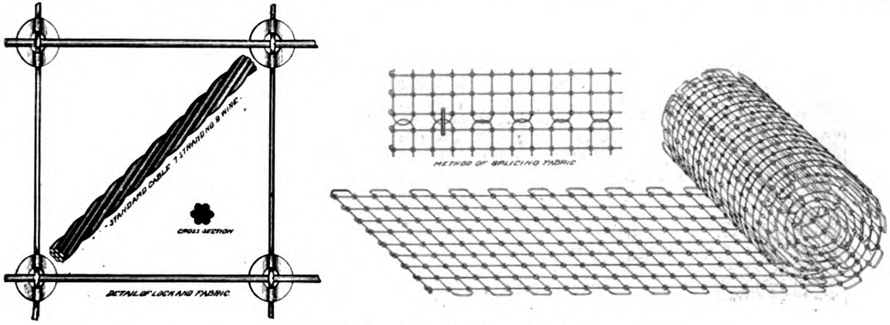


Fig. 9.—Details of the International System.

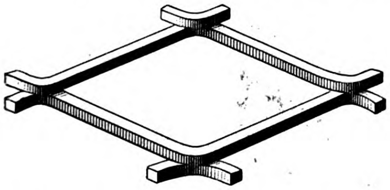


Fig. 10.—A Typical Form of Expanded Metal.

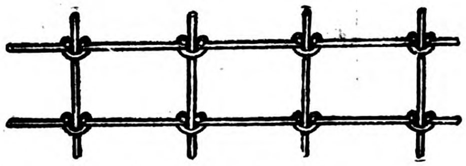


Fig. 11.—Reinforcing Wire Fabric.

Forms of Concrete Reinforcement.

Mensch Corrugated Bar.

Another special form of bar is that shown in Fig. 8 and patented by L. J. Mensch of Chicago. This bar is round in section, with corrugations at intervals. It is made in sizes ranging from 7-16 to 1¼ inches in diameter, and its makers claim for it an elastic limit of 60,000 pounds and an ultimate strength of 100,000 pounds to the square inch. The same engineer also uses the Ransome twisted bar in situations where a deformed bar seems to be necessary, although as a general proposition he advocates the use of the plain bar because of the economy involved, and the bulk of his work is done with plain bars.

International System.

The international system of fire proofing consists of a steel wire fabric in combination with steel cable distributing members, both of which are manufactured from special drawn wire having high elastic limit as well as high tensile strength, though no specific claim is made of using a high carbon product. We illustrate a roll of the steel wire fabric in Fig 9. At each intersection of the mesh the wires are tied or locked by means of a steel disk or washer. In the construction the cables are anchored to the walls or beams and extend continuously to the opposite end of the building. The spacing of the cables is varied according to the desired carrying capacity of the floors, width of spans, &c. Over the cables the steel wire fabric is placed and all are embedded in the lower half of the concrete slab, thus providing continuous reinforcement throughout the entire floor.

The wire cables are formed on a special machine, by means of which they are twisted under hydraulic tension, thus producing an initial stress on the wires. Every wire is stretched tightly in place before the cable is twisted, producing a distributing member which is very stiff and rigid, with greater carrying power, it is claimed, than rods or bars. Ordinary cables are held to be not suitable as distributing members, since they never cease to elongate. The steel wire fabric is made in six different gauges and meshes and is shipped in rolls of any desired length. The manufacturer states that the great majority of the work is done with what is termed the A1 grade, composed of No. 9 gauge carrying wires, more than twelve million square feet of this one grade now being in use in this country.

For columns, girders and beams of reinforced concrete the owner of this system, the International Fence & Fire Proofing Company, Columbus, Ohio, recommends the use of round steel rods, which it claims if used intelligently will produce the same results obtained by any of the various deformed rods, bars or sheared members.

Expanded Metal System.

The Associated Expanded Metal Companies, with headquarters in New York and branches in a dozen cities in the United States and Canada, controls largely the use of expanded metal for concrete reinforcement, as well as a substitute for the ordinary lath. This expanded metal is fabricated by special machinery, which slits a sheet of steel and expands the openings into diamond or other shapes. Sheets are used as heavy as ¼ inch and as light as 27 gauge, the size of opening varying from 6 inches long to ⅜ inch. The largest application of expanded metal is used as a substitute for lath in walls and partitions and a substitute for timber in flooring, although it is also used for vertical members in connection with I-beams, box girders, channel girders and the like. Sheets of expanded metal are furnished in widths of from 12 to 72 inches, the usual length being 8 feet. Expanded metal in connection with concrete is also widely used in the construction of dams, conduits, sewers, tanks, coal pockets, bridges, docks and in general where brick would otherwise be used. Expanded metal manufacturers are now among the largest consumers of sheet and plate steel, as they use annually many thousands of tons of this material. In a building in which expanded metal is employed to the maximum the tonnage of steel is almost as great as

in the older form of steel column and girder construction, while lumber and brick are almost entirely displaced. A typical form of expanded metal is illustrated in Fig. 10.

Reinforcing Wire Fabric.

One of the more recent systems, which has profited by the extensive experimentation of earlier methods, is the reinforcing wire fabric being marketed by the American Wire Fence Company, Chicago. This mesh, as will be seen from a study of Fig. 11, consists of straight longitudinal wires crossed by straight transverse wires, the bond or tie between the two being a special staple or tie which is forced onto the joint by heavy pressure, sufficient to make the bond permanent and yet not enough to break the fiber or destroy the tensile strength of either the longitudinal or transverse wires. This construction has the advantage of presenting the minimum factor of elongation of both the longitudinal and transverse wires, as both are practically straight wires, uninterrupted by kinks or distortions, and both are made of high carbon steel of very high tensile strength and elastic limit, these factors being claimed to be fully double those obtained on bars, or even on the ordinary soft wire. This use of high carbon spring steel not only tends to reduce the cost of the reinforcement, because of the lighter tonnage required, but every pound of weight saved relieves the structure of the burden stress of its own weight. The fabric is furnished in lengths of 300 or more feet, with a standard width of 50 inches. A special device is also provided for joining widths together so as to make practically a continuous fabric both as to width and length.

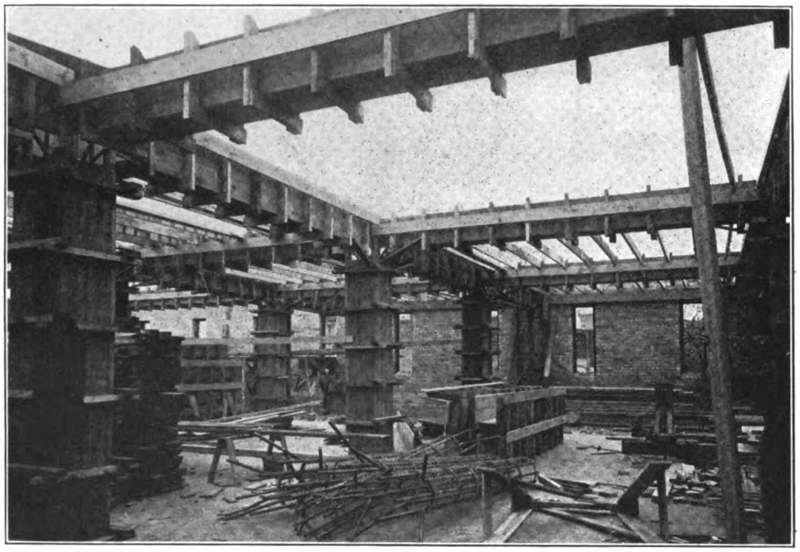


Fig. 12.—View Showing Forms for Inclosing Grills for Beams, Girders, &c.

Wire Reinforcement and Lath.

Many other forms of steel mesh are used as a substitute for lath and as a reinforcement for floor slabs, columns and girders. Most of the wire mills of the country have large customers who either buy the wire and weave it into special mesh for the purpose or have it shipped to them in the finished form. The tonnage of wire that finds its way into building operations in connection with plaster and concrete is very large and is rapidly increasing.

There are doubtless many other special forms of steel used in connection with concrete, but what we have given will suffice to illustrate the activity being exerted in that direction.

Monier System.

This system is the pioneer of all armored concrete systems. It consists in the use of steel bars, usually round, embedded in concrete in such a way as to resist both vertical and lateral tensional stresses. It has been used with success in erecting some of the largest grain elevators in the country, as well as in bridges, storage tanks and buildings. No attempt is made to increase the adhesion of the concrete by means of deforming the bar, as it is held that the natural adhesion is sufficient for all probable stresses.

Hennebique System.

This system consists in the use usually of plain round bars parallel with the lower face of the beam and separate bent rods or stirrups placed over them in a vertical plane, the horizontal rods furnishing the tension members, the bent vertical stirrups resisting the shearing stresses, while the concrete forms the compression members. The bars are usually split at the ends, and concrete tamped into the Y-shaped opening serves as an anchor that offers great resistance to tensional stresses. Thousands of large structures in Europe and hundreds in this country are constructed on this system.

The Turner System.

A system of column reinforcement consisting of grills formed of rods banded at intervals by strong riveted hoops, with one of the rods bent outward into each beam connected to and supported by the column, has been evolved by C. A. P. Turner, an engineer of Minneapolis, Minn. The whole grill he wraps with ordinary wire netting. In buildings carrying moderate loads no beams are used, but merely floor slabs running from column to column or from column to wall. The reinforcement of the slab is directly from column to column and transversely from column to wall. The vertical bars of each column are bent normally to the column in the slab flooring, forming a cap supporting the slab reinforcement. The accompanying half-tone reproduction from a photograph, Fig. 12, illustrates the method of inclosing the grills for beams and girders in forms or boxes, into which the concrete is poured in a semiliquid form. Several grills are shown on the floor in the foreground. He uses on an average 2000 tons of steel a year in his system. He also uses a special high carbon wire fabric for reinforcing floors of long spans.

Fig. 13.—Another Design of Reinforcement for Columns, &c.

Forms of Concrete Reinforcement.

The Cummings System.

Another system for columns, struts, piles, and girders and beams, the standard design of which is shown in Fig. 13, is the invention of Robert A. Cummings, Pittsburgh, Pa. In reinforcing the columns self-centering circular bands are held in horizontal position at close intervals

one above the other by attaching to vertical flat rods or shapes. The structural function of the bands is to prevent the failure of the concrete by lateral swelling, and that of the vertical members to prevent bending of the columns by eccentric loading, thus producing what is claimed to be a rational combination for columns, struts or piles. In distributing the steel in beams or girders the portion of the rods not needed for bending stresses near the supports are made into rectangular frames and bent up at their ends. These rods form anchored loops to resist tensional shearing stresses and being connected become self-supporting, thus obviating the difficulty in holding single bent up rods when placing the concrete. All the remaining rods are straight.

The steel rods range in diameter from ⅜ inch to 1¼ inches. Finished rolled bars rather than wire rods are used in the Cummings system. To hold the rods in correct position in the girders "supporting and spacing chairs" are placed as shown in the accompanying illustration and photograph. This system has the advantage of using only commercial shapes instead of requiring special forms of steel.

Steel Slag Cement.

Fortunately for this new industry cement making interests are keeping pace with the increased demand for their product. The output of Portland cement for 1904 was about 23,000,000 barrels, and this has been augmented so that the 1905 output will be over 25,000,000 barrels. The Illinois Steel Company, at Chicago, has put itself in a position to profit by the possible loss of business on structural steel, due to concrete construction, by erecting at Buffington, Ind., near Chicago, a plant for making true Portland cement from blast furnace slag. This new plant has a capacity of producing 4500 barrels a day, or approximately 1,350,000 barrels a year. This is understood to be the only steel plant in the country that is thus far making true Portland cement from blast furnace slag, though for some years furnaces have been making a form of non-Portland cement that was admirable for foundations, abutments or piers, where moisture was always present and air excluded.

Fire Resisting Construction in London.

The Fire Offices Committee of the City of London has issued a revised set of rules for standard fire resisting buildings, not including cotton mills, flax mills, woolen mills and worsted mills. Buildings to be deemed of standard fire resisting construction must conform to the following description:

Hight and Cubical Contents.

1. Hight not to exceed 80 feet, measured from the lowest point of the land level or ground line of the site on which the building stands to the level of the highest part of the roof.

2. Cubical contents of any one compartment not to exceed 60,000 cubic feet.

N. B.—In computing the cubical contents of a compartment the floor area, excluding doorway and window recesses, and the actual hight from floor to ceiling, are to be measured. Due deduction may be made for a sloping roof.

Walls and Partitions.

3. Brick, terra cotta, or cement concrete composed of broken brick, burnt ballast, furnace slag, clinker or other similar hard and burnt material.

4. No external area or party wall to be less than 13 inches thick in any part, or if of concrete 20 inches.

N. B.—Stone used externally only as ashlaring or facing, with a backing of brick work not less than 13 inches thick, and for dressings, sills, string courses and cornices allowed.

5. All internal partitions to be of incombustible material, excepting only office inclosures of hard nonresinous wood with or without glazing.

6. If there is any building adjoining, the dividing or party wall to extend at least 3 feet above the roof of the fire resisting building.

Flues.

7. All flues to be built of brick work, no part of which toward the interior of the building is to be less than 9 inches thick, and all furnace flues to be lined with firebrick throughout for a distance of at least 20 feet from the furnace. No timber or wood work to rest in or be plugged into the brickwork of any flue.

Openings in Walls.

8. The total superficial area of openings in each external or area wall of any story above the ground story not to exceed one-half of the area of the wall (measured as to hight from floor to ceiling of the story in which the openings occur). All loophole or teagle doors and frames and window frames and sashes to be of iron or other hard metals. All windows above the ground story to be glazed with glass not less than ¼ inch thick, in sections not larger than 2 superficial feet, or wired glass or electro copper glazing in accordance with the rules of the Fire Offices Committee in force when such glazing is provided.

9. Every window or other opening above the ground story opposing (whether directly or diagonally) and within 20 feet of any window, skylight, or glazed or other opening in any other building (whether such latter window, skylight, or opening be protected or not), or overlooking (whether directly or diagonally) and within 20 feet of the roof of any building to be protected by "fire proof" shutters or "fire proof" doors.

Floors.

10. Brick arches, terra cotta, fire clay on concrete, as above described, the floor being in no part less than 6 inches in thickness, and carried on metal joists, girders and columns, or brick walls or piers.

N. B.—Floors of wood not less than 9 inches thick, ceiled with plaster on metal lathing and with the floor boards laid on the bearers without intervening space allowed.

11. Wooden flooring laid on concrete allowed, provided there is no space between the wood and the concrete. Wooden fillets not exceeding 2 inches deep permitted if bedded flush in the concrete.

12. Scuppers to carry off water the openings of each of which shall not be less in area than 21 superficial inches to be provided in the external walls to each floor above the ground story at intervals of not more than 12 feet.

N. B.—In buildings within the city of London or within the area controlled by the London County Council scuppers are not essential.

Roofs.

13. Roofs to be entirely of the incombustible materials as described for floors in Rule 10, except that 4 inches be substituted for 6 inches in thickness.

NOTE.—Glass not less than ¼ inch thick in sections not exceeding 36 superficial inches, set in iron or other hard metal, and wired glass or electro copper glazing in according with the rules of the Fire Offices Committee in force when such glazing is provided shall for the purpose of this rule be deemed incombustible.

Outlets on to roofs rendered necessary to satisfy the requirements of the Factories and Workshops acts permitted, provided that all door and frames be of iron or cased in iron plate at least ⅛ inch thick, and that they be self closing.

Protection of Structural Metal Work.

14. All columns or stanchions to be covered with brickwork or porous terra cotta (at least 2 inches thick), or with cement, concrete or plaster at least 1½ inches thick, keyed into metal supports and protected by a metal guard up to a hight of not less than 4 feet from the floor where cement, concrete or plaster only used.

15. Girders, joists, lintels and all structural metal work (other than columns and stanchions but including framework of roofs), where not covered with brickwork, to be completely encased in porous terra cotta at least 2 inches thick, securely anchored, or cement, concrete or plaster at least 1 inch thick keyed into metal supports.

16. Space must be left at the ends of girders and joists to permit of expansion.

Linings and Ceilings.

17. No lining of wood or textile fabric to any part of the walls, partitions, ceilings or roof.

Floor Openings.

18. No openings through any floors allowed except as follows:

a. Holes to admit driving shafts, pipes and iron or earthenware tubes for electric conductors. Shafts to fit closely in metal collars, and all pipes and tubes to be cemented round the full thickness of the floor.

b. Staircases and hoists of which the inclosures are constructed entirely of brick or cement concrete, as above described, at least 9 inches thick, with a regulation fire proof door to every opening.

N. B.[1]—Stairs and landings within said inclosures to be constructed of incombustible material.

N. B.[2]—Where the building is within the city of London, or in the area controlled by the London County

Council, hard wood doors to openings may be allowed instead of fire proof doors.

N. B.—Where the staircases and hoists extend to the top floors they must have a glass roof protected externally with strong wire work, and the inclosing walls must be carried through and 18 inches above the roof of the building.

In factories and work shops in the area controlled by the London County Council a glass roof, protected as above, is only to be provided in cases where the inclosing walls and staircases are carried through and 18 inches above the roof of the building, and also above the roof of the adjoining premises. Otherwise the roof must comply with the requirements of the London County Council.

c. Belting and rope races inclosed as for staircases and hoists.

Shafting Through Walls.

19. Shafting where passing through walls to fit closely into wall, or have wall boxes closed with iron plates not less than ¼ inch thick, leaving no open space.

Pipes and Electric Conductors.

20. All pipes in the building, except water pipes not exceeding 1 inch in diameter, to be of hard metal. No wooden casing to be used for inclosing electric conductors.

Communicating Compartments.

21. Two or more compartments, each constructed in accordance with these rules, may communicate whether by double fire proof doors or otherwise, provided that their aggregate cubical contents do not exceed 60,000 cubic feet.

22. Two or more such compartments, whose aggregate cubical contents exceed 60,000 cubic feet, can only be allowed to communicate across a fire proof compartment, built up from the basement with walls of solid brick work and constructed in all other respects in accordance with these rules, so far as the same are applicable, and having all openings protected by fire proof doors at least 6 feet apart.

23. Except as above no communication allowed between a compartment constructed in accordance with these rules and any other building or compartment.

The following are the rules now added as to reinforced concrete construction:

Buildings constructed with concrete reinforced in every part with embedded metal rods or bars spaced not less than 12 inches apart, securely connected or overlapping at least 6 inches at all abutments and intersections, having also bands or bars across the thickness of the concrete, may be deemed of standard fire resisting construction, provided they conform to the above rules with the following modifications:

Rule 3. Concrete may be composed of sand and gravel that will pass through a ¾-inch mesh, or of the other materials mentioned in the rule; but in any case the cement used must be Portland (equal to the British standard specification of December, 1904), in the proportion of 6 hundredweight of cement to each cubic yard of concrete. The concrete must be thoroughly mixed, both dry and wet, and must be rammed round the metal work in position, every part of which must be completely inclosed with solid concrete.

Rule 4. No external wall to be less than 6 inches, and no party wall less than 13 inches thick in any part.

Rule 7. Flues may be built of reinforced concrete as described, not less than 4 inches thick if lined throughout with fire clay tubes not less than 1½ inches thick. No timber or wood work to be in contact with such flue.

Rules 10 and 11. Floors must be constructed of reinforced concrete as described, not less than 5 inches thick in any part without wood work bedded therein, supported on beams and columns of similar reinforced concrete.

Rule 13. Roofs must be constructed in a similar manner to floors, the concrete in no part to be less than 3 inches thick.

Rules 14, 15 and 16. All structural metal work must be embedded in solid concrete, so that no part of any rod or bar shall be nearer the face of the concrete than double its diameter; such thickness of concrete must be in no case less than 1 inch, but need not be more than 2 inches.

Rule 22. Fire proof compartments in connection with reinforced concrete structures must also be of reinforced concrete as described, with walls not less than 9 inches and floors not less than 5 inches in thickness.

Rule 18. Inclosure to staircase and hoist, if of reinforced concrete as described, may be 6 inches in thickness.

Buildings conforming to the foregoing specification are charged reduced rates of premium for fire insurance as compared with buildings of ordinary construction.

◆

THE Supreme Court of North Dakota has declared void the law creating the Capitol Commission and authorizing the construction of the capitol and executive mansion, and entered a permanent injunction against further proceedings by the Capitol Commission under the law. This, we understand, puts an end to the controversy regarding the State Capitol for at least two years.

◆

Porosity and Frost Resistance of Bricks.

The prevailing idea about these qualities is that a brick with high percentage of porosity will crack or burst when soaked with water and afterward exposed to a freezing temperature, due to the expansion of the water when changing to ice. This defect will show itself plainer the higher the percentage of absorption. The conclusions usually following such arguments are that a brick with moderate porosity is preferable for building purposes. It is therefore very interesting to know the result of experiments made along this line, and the following table was published by the Royal Technical Experiment Station. The tests were made on ten bricks, and the results are the average of the obtained data. The tests constituted twenty-five times freezing and consequently thawing. In order to find the frost resistance the bricks were subjected to a compression test, and the percentage resistance was figured from the same. To make the results plain the bricks were arranged in order of their percentage absorption, and in case there is any relationship between porosity and frost resistance the last columns should maintain the same ratio as the absorption column. It is evident from these results that these two qualities do not have anything in common. Increased absorption does not always mean less frost resistance. There are a few exceptions, but the main results are very irregular:

No.	Kind of brick.	Absorption percentage.	Compression. Before freezing.	Compression. After freezing.	Percentage loss of stability.
1	Buff face brick	1.32	687	667	— 2.9
2	Paving brick	2.41	764	419	— 45.2
3	Paving brick	3.31	455	432	— 5.1
4	Face brick	3.50	465	411	— 11.6
5	Face brick	4.10	1,197	1,136	— 5.1
6	Hardburnt brick	4.70	508	431	— 15.2
7	Buff face brick	4.98	375	358	— 4.5
8	Face brick	5.63	706	517	— 26.8
9	Paving brick	5.80	342	280	— 18.1
10	Face brick	6.80	227	215	— 5.3
11	Red face brick	6.84	484	469	— 3.1
12	First-class paver	6.90	452	411	— 8.9
13	Common brick	7.70	308	314	+ 1.9
14	Face and pav'g brick	7.82	444	1.488	+ 9.9
15	Common brick	8.17	206	211	+ 2.4
16	Backing up brick	8.30	349	270	— 22.2
17	Common brick	8.30	127	103	— 18.9
18	Sewer brick	8.41	439	354	— 19.4
19	Common brick	8.50	252	246	— 2.4
20	Face brick	9.22	374	383	+ 2.4
21	Common brick	9.94	554	423	— 23.7
22	Machine paver	10.60	229	232	+ 1.3
23	Common brick	10.80	397	271	— 31.8
24	Face brick	11.10	331	310	— 6.3
25	Common brick	11.58	237	227	— 4.2
26	Backing up brick	12.24	271	205	— 24.3
27	Face brick	12.29	251	237	— 5.6
28	Face brick	12.48	384	315	— 17.9
29	Arch brick	13.20	189	180	— 4.7
30	Common brick	13.30	85	74	— 12.3
31	Common brick	13.46	268	277	+ 3.3
32	Machine brick	13.60	369	360	— 2.4
33	Common brick	13.70	207	196	— 5.3
34	Buff face brick	15.16	596	614	+ 3.0
35	Backing up brick	16.31	249	310	+ 24.4
36	Backing up brick	18.85	263	240	— 8.8
37	Machine brick	19.54	218	201	— 7.8
38	Machine brick	19.70	389	356	— 8.5
39	Backing up brick	22.40	166	172	+ 3.6
40	Backing up brick	24.11	105	101	— 3.8

The least frost resistance shows No. 2 a nearly vitrified brick; No. 8 and No. 16 also show great variations. The results in the lower part of the table are very interesting, as it shows high porosity and high frost resistance. Rather remarkable is the increase in compressibility after freezing in several cases.

◆

THAT these are days of buildings of magnificent proportions is evidenced by the structure that is being put up at the Union Stock Yards, Chicago, for use on the occasion of the International Stock Show. It is 600 x 310 feet in size, has an auditorium 310 x 200 feet, an arena 250 x 100 feet, a floor space of 243,600 square feet and will seat 10,000 people.

SAFEGUARDING OF LIFE IN THEATERS.

EVER since the burning of the Iroquois Theater in Chicago, about two years ago, added stimulus has been given to the question of safeguarding the lives of people in places of amusement, and at the annual meeting of the American Society of Mechanical Engineers, held early in December, President John R. Freeman delivered an address on the subject in which he discussed points of vital interest to the architect and builder having to do with structures of this kind. We quote as follows:

It is a fair and moderate statement that fire protection as applied to theatres and buildings of public congregation is from 10 to 20 years behind the fire protection of large industrial works, and true that the fire hazard to theatre property in general, as measured by insurance rates, is ten times as great for the modern theatre as for the modern factory. All of this is unnecessary. The safeguards needed are mostly simple; the main features of some of them are already worked out in the great factories, and the additional safeguards required to be worked out or adjusted for this special case are the automatic smoke vents, the safe proscenium curtain, the safe warming and ventilation and the proper arrangement of automatic sprinklers on stage and in dressing rooms and storerooms.

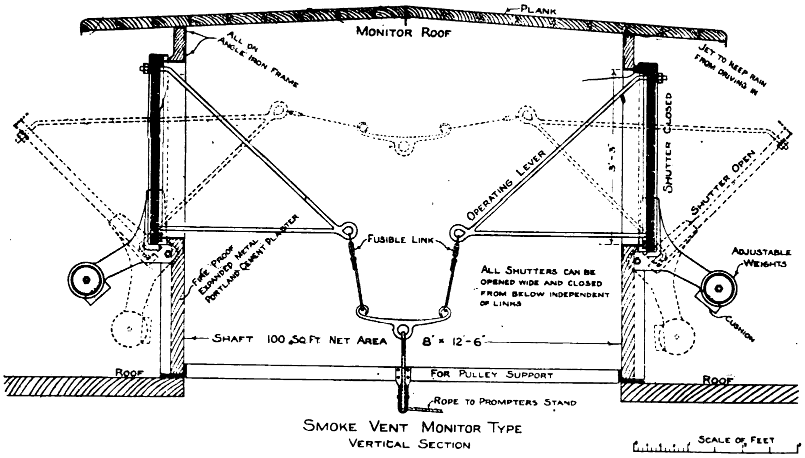


Fig. 1.—A Monitor Type of Smoke Vent Designed by the Author.

Safeguarding of Life in Theaters.

In the course of my own studies of the theatre and auditorium problem I have seen almost everywhere conditions affecting the safety of life that would not be tolerated for a moment by the managers of our best industrial works. For example, I have seen in one of the best New York theatres the wedge shaped space beneath the sloping floor of the auditorium used as a storeroom for trunks and properties. This room was also the plenum chamber for the ventilation. Suppose that any cause should start even a slow smouldering fire in this room; the smoke rising through the air ducts in the floor might throw the audience into a panic and cause great loss of life. In one of the most famous halls in America I found the portable wooden flooring used to transform the main seating space into a ballroom stored in a dark passageway which formed the main air chamber between the heating coils and the concert hall, all thus kiln dried to perfection, and when I showed it to the manager and to an intelligent aldermanic committee and urged its immediate removal they saw no danger and thought me hypercritical and could not even see that automatic sprinklers would be of use in such a concealed storage space. In Chicago, within a few months after the appalling disaster at the Iroquois Theatre, the aldermen rescinded the rule calling for automatic sprinklers over the stages and rigging lofts of the theatres because the managers believed they "wouldn't do any good" and "might start a panic should one happen to open prematurely." Every factory manager or mill engineer will admit the absurdity of such a statement. In Boston the law still accepts the non-automatic sprinkler pipe, to be opened by hand, a device which has now been generally discarded in factory fire protection, in favor of the automatic. Most important of all, I have found behind the scenes and in the mechanics' rooms a lack of the scrupulous neatness and order that characterizes a modern well organized factory, have found a multitude of dark, concealed spaces used as catch alls and an apparent lack of appreciation by owner and architect that a flood of daylight in storerooms, workrooms and dressing rooms is the best of all safeguards by making dirt, disorder and dangerous rubbish conspicuous.

I first became actively interested in this question by the burning of the Iroquois Theatre at Chicago a little less than two years ago. I examined the structure before any of the wreckage had been moved, listened to evidence before the coroner's inquest, counseled with the Mayor and committee of the Board of Aldermen, questioned eye witnesses and inspected many other theatres in the effort to reach a clearer understanding of their special hazards. This fire occurred when the theatre was crowded. The firemen were on the ground within little more than five minutes from the first alarm, but even by that short time most of the victims had already become suffocated.

The scene of this appalling disaster was the newest of Chicago's theatres, a building of fire proof construction that justified the name so far as the building itself was concerned. Little except scenery, decorations and upholstery was damaged. It is true that there had been shameful neglect in important details of fitting up, that fire hose on the stage had been delayed, that fire pails and soda water fire extinguishers were absent, that the ventilating skylights over the stage were blocked so they could not slide open and that exits were poorly marked; but I have come to believe that had these all been in the condition commonly found in American theatres the result of the fire might have still been appalling.

The great lesson of the Iroquois fire was only a repetition of a lesson that has been given several times before and each time forgotten. The recurring formula is:

A stage crowded with scenery.

The sudden spread of the flames over this scenery.

The opening of a door in the rear of the stage, an inrush of air.

Scant smoke vents over the stage, an outburst of smoke under the proscenium arch.

Death to those in the galleries.

The obvious suggestion might be: Make the scenery

incombustible; but the efficient fire proofing of scenery, so that it will not all burn up if a fire once gets well started on the stage, simply appears to be impracticable.

The ordinary construction with a high, spacious chamber for the hanging loft above the level of the proscenium arch makes it a simple matter structurally to keep this fire and smoke out of the auditorium, and no matter how great the mass of flaming scenery a smoke vent of one-eighth or one-tenth the area of the stage, if instantly opened, would probably prevent suffocation. The conditions are similar to those of a fireplace. The high space over the stage screened by the arch is adapted to give the best of chimney draft. An ordinary rule is to make the throat of the chimney at least one-tenth the area of the fireplace opening or the space through the damper one-eighth the area of the hearth, and when we simply provide an adequate chimney area and a damper that will surely open we shall have adopted a safeguard that would have saved four-fifths of those who perished at the Iroquois, regardless of defective curtain, defective exits and absence of fire hose on the stage.

In a way it has long been recognized that there should be a large ventilator over the stage, and one city has copied from another the building law that in New York City reads:

> There shall be provided over the stage metal skylights of a combined area of at least one-eighth the area of the stage, fitted with sliding sash and glazed with double thick sheet glass, . . . the whole of which skylight shall be so constructed as to open instantly on the cutting or burning of a hempen cord. . . . Immediately underneath the glass of said skylight there shall be wire netting, . . . &c.

The evident purpose of the thin glass is to cover the opening with something that will break out under heat if the mechanism for sliding off the cover fails. The wire netting is to prevent broken glass from falling to the stage. The idea of a large ventilator is all right, but the execution is commonly all wrong and needs some good engineering to provide a design of damper with careful details that will be sure to work. Note the antiquated suggestion of the burning of a hempen cord when fusible links have been used on the fire doors in your factories for 20 years. And in one of the newest and best New York theatres I found the ventilator had a broad sheet of heavy canvas laced tightly across its opening with marline because the cracks around the ventilator let in too much cold air. The requirement of thin glass in the building law is well meant, but it would be too slow in breaking out and the wire netting called for is a positive danger as often applied.

These links have been in common use on automatic fire shutters in our factories for nearly twenty years. It is strange, almost beyond belief, how slowly and scantily these have found their way into the fire protection of theatres. These links melt open at about 162 degrees Fahr., and thus will open long before flame reaches them. Their cost is trifling. Links will break under a load of about 200 to 500 pounds, but can be trusted to sustain continuously a load of only about 50 to 100 pounds. All of the known solders that fuse at low temperature are subject to stretching or "cold flow" under long continued load, unless these loads are made extremely small, and one of the most important features in the design of any such link is to make the direct stress upon the solder small and in tension over a large area rather than by shear. The links will open with about the same promptness as an automatic sprinkler. At the top of the rigging loft over a fire like that on the Iroquois stage they probably would open within 20 to 40 seconds after the blaze got a good start.

To illustrate that the problem of smoke vent design can be solved along various lines I have worked out two models shown in the accompanying drawings. It is best that the total area of one-tenth the stage be subdivided into four independent units.

The fundamental requirements are as follows:

Absolute certainty of opening by force of gravity, in spite of neglect, rust, dirt, frost, snow or expansion by heat, twisting or warping of the framework, quickness of opening to be secured by automatic links of the thinnest metal practicable and also by controlling the doors by a cord run down to the prompter's stand and to the station of the stage fire-guard; the operative mechanism of the smoke vent should be simple and massive; it should be of such form that it can be tested daily or at least at the weekly inspection by partially opening it, preferably closing it again by means of the cord running to the prompter's stand. It may add to its safety if it can be used whenever needed for the ordinary ventilation of the stage, thereby keeping it under constant notice.

In the first of these designs submitted, shown in Fig. 1, the 8 x 12 foot opening, of which four would be needed over the stage of ordinary size, has a roof for protection from rain and vertical sides that contain four small windows for admitting daylight to the rigging loft, but which can be closed by ordinary window shades for dark scenes. All necessity for the wire screen is avoided. The four shutters fall outward lest the pressure of the updraft tend to hold them shut and are pulled open by force of gravity, opening to the full area called for. The

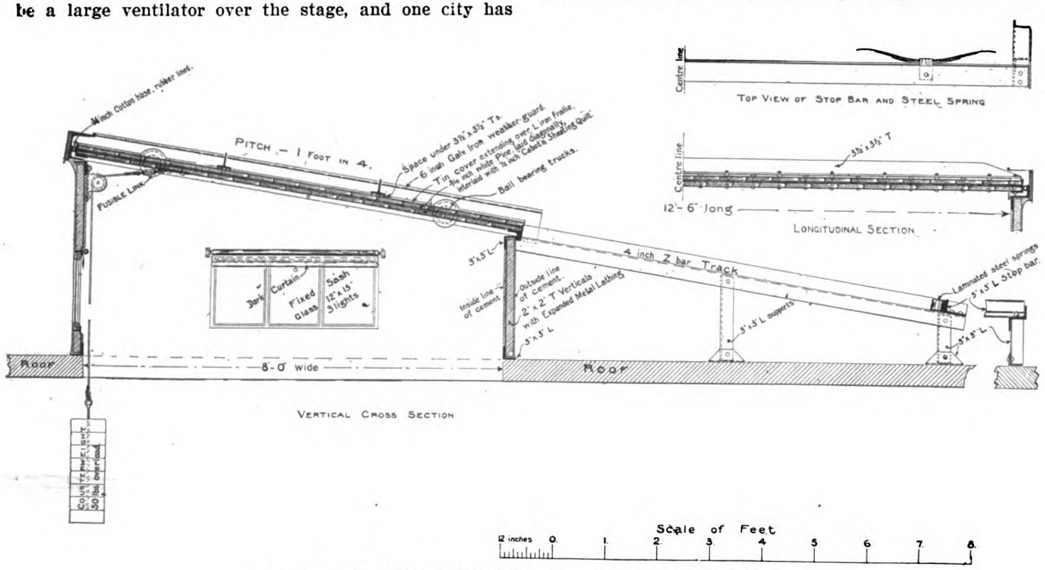


Fig. 2.—A Smoke Vent with Sliding Cover Designed by the Author.

Safeguarding of Life in Theaters.

pull on the rope holds them against their seat, which, if made with a thin edge pressing loosely against fibrous material, as shown, will be more tight against cold air drafts than a common window sash or house door. Fusible links are inserted in each of the four branches of the cord. No sprinkler should be placed up within the monitor containing these links, and care should be taken that the links are of a thin, quickly sensitive type.

In the second design, Fig. 2, the sliding type is used. This obviously cannot be used as an ordinary ventilator on rainy days. The special effort in remodeling this from the current New York type has been, first, to place the glass in the vertical side so that no necessity for a wire screen remains. Second, to provide a better track and trucks and arrange the joints so that the leakage of air through the clearance space would not tempt the janitor to close the space by something that may interfere with the sliding open.

Fig. 3 shows an arrangement of a safety ventilating shutter that sometimes can be conveniently placed in the brick wall near the top of the rigging loft.

The safeguard second in importance is the complete equipment with automatic sprinklers over the stage and throughout all rooms except the auditorium. I unhesitatingly recommend them as the best means for promptly controlling a fire that has once got good hold in the scenery upon the stage of the theatre. It has been claimed that under the high rigging loft of a theatre sprinklers at a distance of 60 or perhaps 80 feet above the floor would not open with sufficient promptness to be of material service. I am confident that this is untrue. The hot air from a fire quickly travels over a vertical distance of 60 or 80 feet. Not more than five to ten seconds' time would be required for this, and the conditions for pocketing and confining the heat to a small area in the top of the rigging loft of a theatre are much more favorable than in many portions of factories where sprinklers are found to work successfully. The rainfall from a series of automatic sprinklers with 80 square feet to the sprinkler and ordinary water pressure would be about 25 inches per hour. One series should be placed below the gridiron and preferably another series above it, these not being vertically over one another. A line should also run along the lower outer edge of each fly gallery. The 162 degree sprinkler should be used.

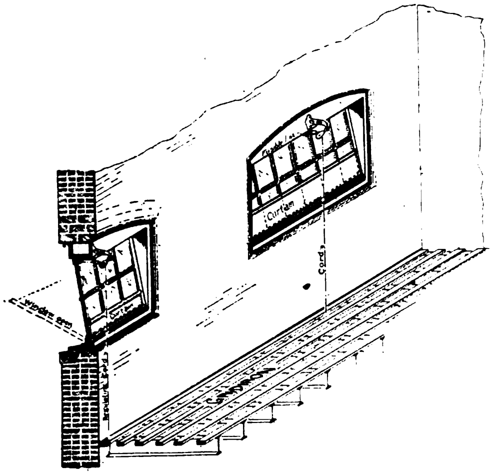


Fig. 3.—Safety Ventilating Shutters.

Safeguarding of Life in Theaters.

The third of the safeguards is the curtain for closing the proscenium arch. The fire curtain for covering the opening under the proscenium arch in nearly all American theatres outside Chicago at the present time is made from a heavy canvas woven from asbestos fiber. In Chicago the Aldermanic Committee has made the steel curtain the rule. In the present state they merit little criticism except the absence of a positive down haul and better holding and guiding in iron channels at the edge. Like nearly all steel ribbed shutters they will warp and twist off their seats under 10 to 15 minutes' exposure to a severe fire unless securely held at the edges, and should smoke vents be closed and sprinklers lacking and a back door open their loose fit would let volumes of suffocating smoke and tongues of flame pass into the auditorium. With the smoke vents open and the draft therefore inward they will serve their purpose until the audience has escaped and the firemen have arrived.

We experimented upon sundry combinations of asbestos, asbestos felt and asbestos cement with thin steel plate and combined with wire netting, the asbestos being placed on the stage side, and it was plain that the steel curtain protected with some asbestic material on the fire side possessed far greater strength and endurance against fire than the simple asbestos. With care given to the design of the guides and fastenings at edges and top, so that after it was lowered the curtain could not be pulled out by warping, buckling, "smoke explosions" or pressure of air, the steel curtains would probably hold the fire from entering the auditorium.

The general type of steel proscenium curtain finally adopted in Chicago consists of a light framework of steel angle irons with corrugated plate about 1-16-inch thick on the auditorium side and some asbestic nonconducting material on the stage side, with an air space of 1, 2 or 3 inches between. Where guided only by loops on vertical cables it is required to lap over the edge of the arch about 8 inches. A structure of this kind of the ordinary size weighs from 2 to 6 tons. The hanging would be improved by more substantial iron channels to hold the edge and by the addition of positive down-haul tackle or some arrangement by which the counterweight could be thrown off, for now the great weight of these curtains is so nearly counterpoised that the air pressure against their surface may prevent the slight excess of gravity from lowering them.

A type of fire escape has been developed under the Building Laws of Philadelphia primarily for use in factories which is so remarkably efficient and so far ahead in safety of anything else that exists that we may wonder why it has not been copied in other cities. It is somewhat expensive, but the safety it gives is well worth the extra cost. The fundamental idea is that the stairway tower is absolutely cut off from the various rooms and floors which it serves. One must go out from the room into the open air and then enter the stairway. Once within this he can proceed without danger to the bottom. The same idea can be applied to the fire escape from a theatre.

In safeguarding our factories against fire we find systematic inspections and the filing of a weekly report one of the very best means toward safety. They would be of equal value for the theatre. A printed blank can readily be devised for each case. This should cover the completeness and operative condition of all valves, fire hose, sprinklers, fire pails, soda water extinguishers, hooks, fire doors, exit locks and latches, smoke vents, fire curtain mechanism, and particularly of the neatness, cleanliness and order of every room, passageway, closet, air chamber, loft, basement and fly gallery used as a part of the theatre building. This inspection should be made on each Monday afternoon, since the week end is the time when attractions are commonly changed and the confusion is most apparent.

A private fire brigade from the regular stage hands and ushers should be drilled regularly, the Monday drill to be a "wet drill," testing the stage hose and a few of the soda water extinguishers, which may be turned out of the window to the areaway or into some convenient drain provided for the purpose at the rear of the stage. The head stage carpenter should always be present during a performance as chief of this brigade.

◆

INSTANCES are numerous where roofs that have been temporarily repaired with elastic roofing cement have given no further trouble for ten years. The slaters' roofing pitch, which is put on hot, is said to be especially adapted for all kinds of roofs.

PERSPECTIVE DRAWING FOR THE BUILDER.—IV.

By M. M. Sloan.

ONE other form of perspective, known as parallel perspective, is usually employed for the interiors of rooms, hallways, corridors or the façade of a building having projecting wings or pavilions with a depressed central feature, as shown in plan in Fig. 16. In laying out parallel perspective less lines are necessary than in angular perspective, since there is only one vanishing point, and the principles are therefore comparatively simple. Before proceeding with the description of this method, however, some of the results of which it is capable may be noted and for this purpose reference is made to Figs. 14 and 15. Fig. 14 shows the plan and elevations of a long hall or corridor, which is shown in parallel perspective from several points of view in Fig. 15. At A the vanishing point has been taken exactly at one-half of the hight of the room and in its center laterally. It will be observed that the rear end of the room is a rectangle similar to that of the near end and that all lines vanish to the vanishing point V. At B the rectangle representing the back of the room is of the same size as the one illustrated at A, but has been moved to the right so that more of the features of the wall on the left are shown. The position of the horizon has, however, not been changed. By lowering the horizon and shifting the rectangle representing the rear of the room nearer the lower left hand corner, as shown at C, still a different view of the hall is obtained. Again, at D the station point for the view has been taken nearer to the picture plane and the effect is to give the hall the appearance of greater length, due to the greater difference between the size of the section of the room in the picture plane and that of the rectangle representing the rear end. It is evident from this that, no matter at what hight the eye is located or whether it is to the right or left of the center, the relative size of the rear wall of the room with reference to the section in the picture plane remains the same so long as the station point or position of the observer remains the same distance from the picture plane; but that when the position of the observer is moved toward the picture plane the apparent size of the section on the picture plane is relatively greater than that of the rear end of the room and the effect is to increase the appearance of depth, sometimes to an abnormal degree. It is therefore best in making a perspective view of an interior to take the station point not too near the picture plane.

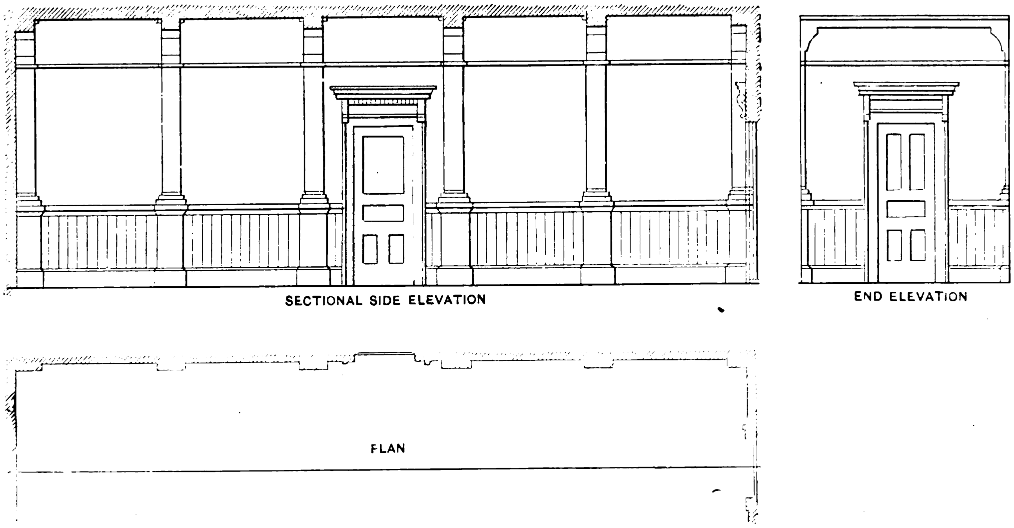


Fig. 14.—Plan and Elevations of a Corridor to Be Used in Illustrating Interior Perspective.

Perspective Drawing for the Builder.

In laying out parallel perspective the perspective plan may be employed as explained in connection with angular perspective. In illustration of this the reader is referred to Fig 16, in which A represents the plan of a rectangular recess or courtyard surrounded by the walls of a building. The façades of the two wings *a b* and *e f* may be considered as lying in the picture plane, and consequently in laying out the perspective shown at B below all details on these façades may be drawn accurately to scale. The façade *c d* at the rear of the courtyard, however, while being back of the picture plane, is parallel thereto and becomes therefore very similar to an elevation drawn to a reduced scale, which scale can easily be determined after the point of sight is chosen if its use in drawing that part of the view is desirable. The length of *c d* of the plan in Fig. 16 may be obtained in two ways. The first is to establish the station point S at the desired distance from the picture plane and to then draw lines from the angles *c* and *d* to this point, cutting the picture plane as shown at *x* and *y*. These points being projected to the perspective, the lines *h c'* and *j d'* are located.

Another way of locating these lines is to lay out at once a perspective plan, as illustrated at C in the lower part of the figure. The method of procedure in this operation is very similar to that explained in connection with Fig. 13. Through S, the station point of the plan A, Fig. 16, draw the line G G to correspond with L L of Fig. 13. Now lay off above G G a distance, *w*, equal to the hight of the point from which it is intended to view the building, and through the point so obtained draw H H, the horizon line of the perspective plan. From S lay off on G G each way a distance equal to the assumed distance of the point S from the picture plane P P, as shown at *p* and *q*, and from the points *p* and *q* erect perpendiculars cutting the horizon line at M P¹ and M P², also thus locating the measuring points. These points can be located by drawing 45-degree lines from S, cutting P P as shown at *u* and *v*, from which points lines are dropped to H H, locating M P¹ and M P² as before.

From the angles of the receding wall *b c* and *d e* of the plan vertical lines may now be projected to intersect G G of the perspective plan, as shown at *m'* and *m''*, and marking in the perspective the position of the two exterior angles *d b'* and *f e'* of the court. Upon these lines the hights of the several windows, belt courses and other details of the façades may be set off to scale. At any con-

venient position above or below the plan A the ground line G′ G′ may now be drawn, and at a distance, *w*′, above the same, equal to *w* of the perspective plan, the horizon line H′ H′ of the perspective view is drawn, upon which the vanishing point V′ is projected from V of the plan below, as shown. The horizontal distances of windows, columns and whatever details the receding wall *b c* may contain as measured from *b* may be set off on G G of the plan, measuring from *m*′ toward the right, and lines from the several points so obtained carried toward M P¹, cutting the line *m*′ V of the perspective plan. Lines carried vertically from these points of intersection into the perspective view will give the true position of the details respectively represented, while lines drawn from the points previously obtained on *d b*′ toward V′ will determine the hights, all as shown.

As explained in connection with Fig. 15, if the station point in parallel perspective is taken too near to the furthermost portion of the picture the lines perpendicular to the picture plane will diverge rapidly and the appearance of the view will be as shown at D of that figure. If, however, the station point is at a considerable distance away the difference between the furthermost wall and the portion of the picture in the picture plane will not appear unnatural, and the result will be as shown at A of the same figure. In illustration of how the position of the view point determines the comparative size of these two planes, let it be supposed that the view point S of Fig. 16 be moved to the point marked T. The lines drawn from the angles *c* and *d* to the point T show by their intersection with the picture plane that the width of the further wall would then be represented by *v w* instead of by *x y* as when it is viewed from S.

(*To be continued.*)

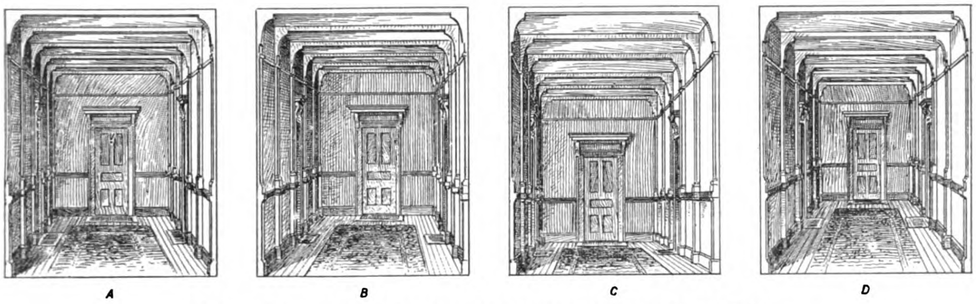


Fig. 15.—Interior Views of the Corridor as Seen from Four Different Points.

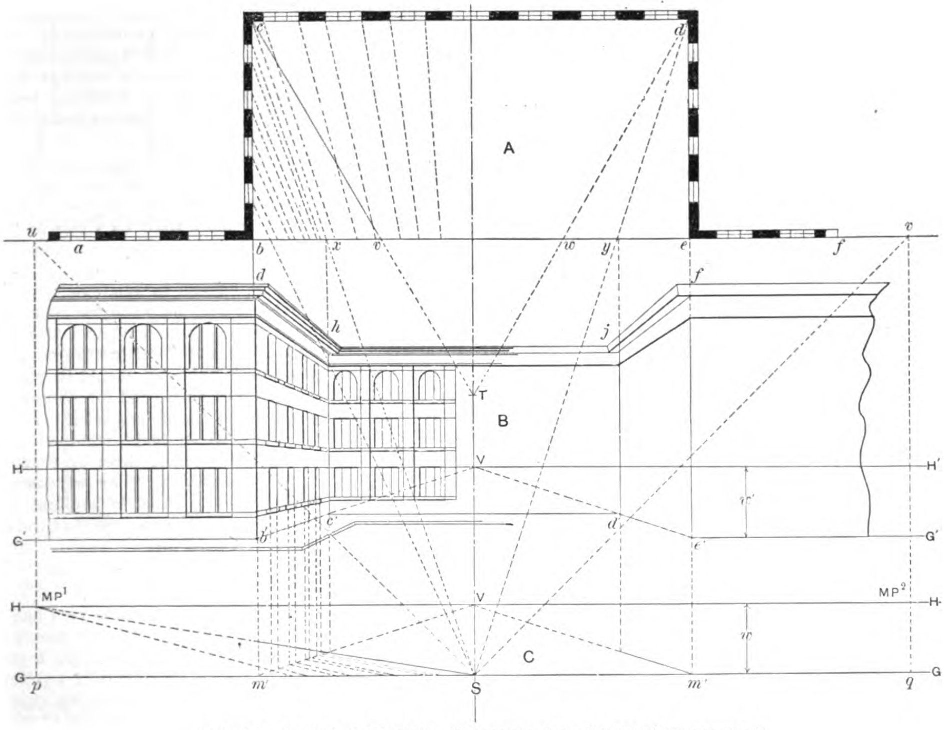


Fig. 16.—Method of Obtaining Measurements in "Parallel Perspective."

Perspective Drawing for the Builder.

Utilizing the Cellar in Winter.

The cellar of the modern country home should be a dry, hygienic place, where a multitude of things can be safely stored, and at the same time it should be utilized for purposes which will add to the pleasure and profit of the occupants, says George E. Walsh in a recent issue of *American Homes and Gardens.* The cellar of the modern house should be divided into at least three compartments. One for coal and wood, which need not be large, but the partitions of which should be so tight that coal dust and ashes from the furnace cannot escape to other parts of the cellar. The second compartment should be for the storage of perishable goods, such as winter fruits, vegetables and butter, cheese and eggs. This in turn should be sub-

divided into separate compartments for the dairy products fruits and root crops, so that the former cannot get tainted by the odors from the latter. The third compartment should be for a general workshop, flower boxes and for miscellaneous storage of articles that are not needed in the living room.

Assuming that the cellar floor is of good concrete, which will insure protection from dampness and excessive moisture, it is wise to make the division into compartments according to the special needs of the different work. The perishable goods require no sun and it is better to locate the compartment for them on the north or northwest side of the cellar, where it will be easier to secure an even temperature throughout the winter. To insure this, however, double sash windows should be supplied and as the winter advances the windows should be closed by piling straw litter or hay against them on the outside. At least one or two should be left unprotected in order to secure proper ventilation and sunlight. Fresh air should be admitted every pleasant day, and when the temperature is not excessive outside a continuous circulation of air should be obtained by an outside shaft and an open window.

The ventilating shaft is nothing but a simple, elongated box or trough which enters the cellar opposite the window which is to be left open. This ventilating tube should have an inside and outside door or sliding board to close it in cold weather. The window that is not closed tight for the winter should have an outside wire netting to prevent the sifting of articles into the cellar. By having double window sashes the cold can be kept out of this single window very well, but an inside board, lined with newspapers, arranged to drop down and hook on very snugly, will add to the protection from outside air at night time.

Compartment for Perishable Articles.

The compartment for perishable articles should be separated from the rest of the cellar by a partition of 3-inch studs and joists, with plain pine or whitewood boards nailed across them. By tacking up an inside lining of old newspapers the partition will prove very effective in keeping out the heat and dust. All cracks and knot holes can be closed with the newspapers and by pulling them down and replacing them with new papers once or twice in the winter the compartment for perishable articles can be kept very clean and sweet.

In this compartment the inclosure for milk, butter, cheese and eggs should be separated from the place for storing apples, potatoes and other fruits and vegetables by a partition of light boards, lined inside and outside with tarred paper, or, if one objects to the odor of the tar, tack common manila paper over the boards. By inclosing the compartment for dairy products in this way we secure complete immunity from all odors and dust. As butter absorbs odors and microbes from the surrounding air it is quite important that it should be protected from anything that will injure it. A decaying potato or apple or the odor of onions, carrots or turnips may very quickly spoil the flavor of the best butter.

The compartment described should open into the cellar where the heating apparatus is located by a double door, and it may be that heat from this room will be needed during a few days in the middle of the winter to keep the temperature above the freezing point. As a rule, however, the compartment built as described will never reach the freezing point in the coldest weather, but the temperature will hover just above it and remain there all winter. A uniform temperature of a cellar is almost as desirable as a low one.

The compartment for the heating apparatus and the coal and wood bins can be located conveniently on any except the south or sunny side of the cellar. It may be north, east or west, but the southerly exposure should be kept for other purposes. The coal bin should be made as dust proof as possible and this can be obtained by simply using old newspapers for covering crevices and knot holes in the wooden sides. They can be tacked on several sheets thick and by overlapping them at the edges they will make the bin tight. A little tar daubed over them will make the protection additionally perfect and tend to make them more permanent in character. By keeping all the dust and ashes in this part of the cellar we secure results that greatly lessen the labor of the winter. When coal dust and flying ashes penetrate every part of the cellar it is impossible to keep articles clean and fresh. This can be readily demonstrated by examining the whitewashed surface of the boards after the cellar has been closed up a few months. The sides of all the partitions opening on this part of the cellar should be whitewashed fall and spring, and the accumulation of dust and dirt can thus be partly neutralized. By using an old broom to clean the boards before the whitewash is applied we add to the general cleanliness and sanitary condition of the place.

Finally we have the third compartment of the cellar, which may prove a very profitable and pleasurable place for many winter occupations. Facing on the south the windows admit sunlight during a few hours of the day. This will make the compartment light and pleasant, and it can be fitted up with a few luxuries, such as old chairs, odd bits of carpet and sofas that have been discarded from the living rooms above.

There should be built in this part of the cellar a carpenter's bench, provided with a hand vise, tool rack and other conveniences. No one is too clumsy not to be able to use carpenter's tools for many small repair jobs around the house. There is an endless number of improvements to be made in the winter season, and preparation for spring can be anticipated in the cellar carpenter shop. Sashes for hotbeds and cold frames can be painted and new glass put in, window blinds repaired, flower boxes designed and built, seed frames constructed and many other simple articles of necessity manufactured. A coal stove in this part of the cellar should supply additional heat on cold days, although in ordinary weather the heat from the furnace should be ample. Sufficient heat can be admitted during work hours by opening the doors connecting the two compartments.

The important question that occurs to many in attempting to utilize a cellar for such varied purposes is the degree of sunlight admitted. The ordinary cellar window is a small affair, scarcely more than 1 x 2 feet, and until architects show a more generous desire to increase the size houses will thus be spoiled in the making. If the foundations are not high enough to admit of larger windows a sloping excavation such as made for cellar stairs should be dug down below each window. The bricks should then be knocked out and a window frame at least 3 or 4 feet long and 2 or 3 feet wide should be placed in the walls. Double sash will be needed for winter work, and the sides and bottom must be joined carefully to shut out the wind and snow. Such large windows on the south side of the house will admit three or four times as much sunlight as the ordinary cellar windows, and when we consider the sanitary value of sunlight in the dampest part of the house it will be agreed that the extra expense and work are well paid for.

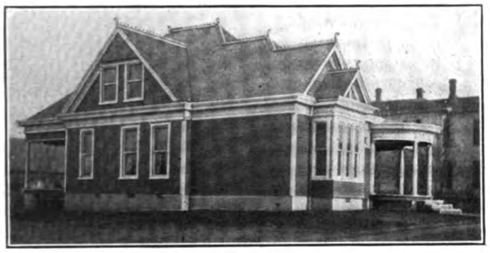
◆

The fire waste in the United States this year has been appalling in its extent. During the first six months the loss from this cause averaged over $25,000,000 a month. Of course, this sum was very substantially swollen by the great fire in Baltimore, but, even leaving that loss out of the account, the fire loss for the first half of the year reached the largest total ever recorded for a similar period. Notwithstanding all efforts in the direction of fire proof construction and the increased efficiency of the fire departments of our cities and towns, the annual waste from this cause continues to mount up rapidly year by year. It would seem that the general adoption of safer methods of building and more effective inspection laws is imperatively needed to check this deplorable annual sacrifice of valuable property, and, in too many instances, of still more valuable human lives. "Prevention is better than cure," therefore the matter of fire protection and prevention should occupy public thought and effort in larger measure than do the relatively less important arrangements and appliances for fighting fire, useful and necessary as are the latter.

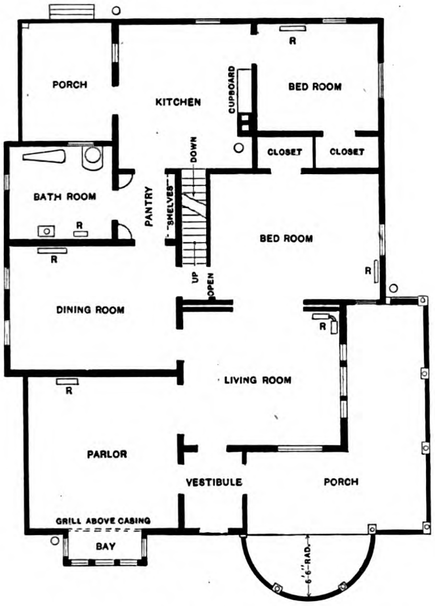
CORRESPONDENCE.

A Low Cost Cottage.

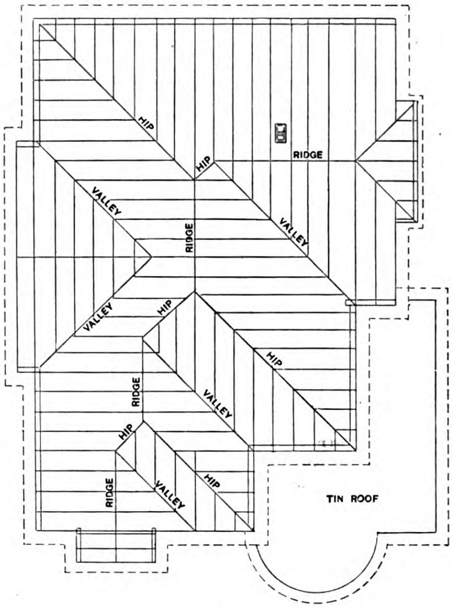
From W. L. R., *Mount Carmel, Ill.*—I have been a regular reader of *Carpentry and Building* since 1888 and consider it the best paper on the matters treated I have ever seen. In following its columns from year to year it strikes me that there is a dearth of good cottage homes suitable for small families who do not want a two-story house, and as I have contributed almost nothing to the pages of the paper during the long period I have been one of its readers I take the opportunity of sending plans and photograph of a cottage I built last fall. The foundation is of brick and the cellar is concrete. The house is finished throughout with best yellow pine, heavy molded caps on all doors, windows and openings on a line at the top, the caps being finished with ⅞ x 1½ inch pressed molding. The bay window of the parlor is back paneled and there is a grill above the casing. The transoms over the front window, front door and in the front end of the vestibule are glazed with leaded bevel plate glass, fine patterns, while the front door is veneered oak outside and has a large panel of bevel plate glass. The veranda posts are 8 inches by 8 feet over all and capped with molded capitals. The roof is tin, which is nailed to the facia of the house cornice at the back. The roof has about 3 inches fall and the floor 2 inches in 8 feet. The foundation is 2 inches lower than the house foundation; the joists are 2 x 8, all radiating from the house frame. The garret is floored entirely over and at small expense two or three good rooms may be added.



Perspective View.



Floor Plan.



Roof Plan.

Scale, 1-16 Inch to the Foot.

Design for a Low Cost Cottage.—Contributed by " W. L. R."

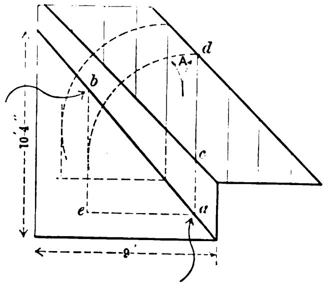
Location of Registers and Flues.

From J. M., *St. Paul, Minn.*—This is the season of the year when heating and ventilation are timely subjects for discussion, and I shall be glad to see printed letters from all sections of the country. I will open the ball by stating that I favor the location of the ventilating registers in the rooms of a residence near the floor. There are seldom enough people in an ordinary residence to seriously contaminate the atmosphere or to raise the temperature so that the vitiated air will remain at the top of the room. The ventilating register near the floor carries off the cool air in the room and makes it easy for the fresh, warmed air from the furnace to enter. This air, being at a higher temperature than any air in the room, displaces and drives out the vitiated air through the lower opening.

In churches there are times when there is an advantage in having two openings into the ventilating flue, one near the floor and one just above the heads of the occupants. The same is true in reference to the school, but as neglect to use good judgment in closing these upper registers is liable to allow the warmed air to pass off and the building to become cold, ventilating registers near the floor serve all practical purposes.

The size of the ventilating plates should be governed by the size of the hot air inlet registers. It is seldom necessary to make them of the full size, as the air is cooled and requires less area in the outlet than in the inlet registers to dispose of the same amount of air. Ventilating pipes by all means should be run vertically and if possible some arrangements should be made for heating them. A ventilating flue may not act as intended if it is not heated. In fact, cool air may enter the building through the ventilating flue under some conditions. If these flues run directly through the roof they should have some sort of a ventilating cowl or cap which will prevent wind from blowing down them and which will utilize the force of the wind to produce an exhaust current in the flues. If an attic is available all of the vertical ventilating pipes may connect with a large receiving duct located at some convenient point, and where it passes through the roof the ventilating cowl or cap should be used to avoid an undesired effect from the wind.

When indirect steam and hot water heating systems are used the arrangements for ventilation may be the same as with hot air furnaces. The use of the ventilating system in connection with direct steam and hot water radiators is apt to cause disagreeable drafts of air entering around doors and windows. If there is some large room on the first floor of the house into which various rooms connect, and this receiving room has an open fire place in it connecting into a flue in the same chimney that is used for the smoke flue of the heating apparatus and of the kitchen range, the flue may be sufficiently heated to induce a ventilating effect through the open grate even when there is no fire in it. Such a fire place will be beneficial to ventilation with any method of heating.



Finding Lengths and Bevels of Jack Rafters for Deck Roof.

Finding Lengths and Bevels of Jack Rafters for Deck Roof.

From L. H. H., *Vincennes, Ind.*—It looks like "J. A. K.," Detroit, Mich., was so near a correct solution of his own problem that I have simply reproduced his sketch to answer his question relative to the length of jack rafters framing in between a hip and valley. The lines shown by the double headed arrow A are the base lines of a rafter shorter than the common rafter, whose base is 9 feet and rise 10 feet 4 inches. The distance between the arrow points *a* and *b* is the required length, making the proper deduction for the thickness of the principal rafters. In other words, make the distance *a e* equal to *c d* and raise the perpendicular *e b*. The intersection of these lines with the common rafter equals the length of jack from center of hip to center of valley.

Modern Methods of Shingling Roofs.

From L. H. H., *Vincennes, Ind.*—I am pained to read such statements as those made by "Western Builder." It grieves me to think what a failure I am and also what a mistake the whole carpentry business is as we know it. I began my apprenticeship in 1872, since which time I have been in active service, or thought so until I read "Western Builder's" letter. But I find my experience is very tame. My boss put me in charge of a gang the third year and since that time I have had from two or three to 85 or 90 men; have put up buildings which counted the floors by the acre instead of by the foot, but never have I seen the man who could nail 5000 4-inch shingles in ten hours, let alone 3500 in three hours, or 19 4-9 singles per minute. This is too swift for us. We had a man who used these advanced methods many years ago. He is the party who shingled 15 feet out onto a fog just before day while roofing old Mrs. Stephenson's barn, and the barn is there yet to prove the story. We have had as many as 50 different carpenters at work for us in the past year and a half. One of the 50, and only one, fitted, hinged, put on the locks and cased both sides of the openings with ordinary cabinet trimming, of five doors. Dear brother "Western Builder," is this what you call hanging and trimming a door? If so, we are away back and could not hold a job as an entered apprentice with your advanced ways. Now, just to be honest, this little stool and the peg in the hatchet business is not practical and won't work (here in Vincennes). Men have learned their trades in certain ways, have formed unions and do their work the way they know or not at all. More than this, one has to put up with just what the men do for us contractors or be a crank. We pay the scale and our men do not average 3000 shingles per day. I will also remark that I shingled with a stool away back in 1873, but found no advantage in it, but absolute danger on anything steeper than one-third pitch.

From Toiler, *Toronto, Canada.*—I have had the pleasure and guidance of your valuable paper for 10 or 12 years, but for pure wind and lots of it "Western Builder" should receive the palm. I have been pretty well over the United States, having spent some time in California, but I have yet to find the place where one man can lay 10,000 shingles in one day, while in most places 4000 are considered an extraordinary day's work on any kind of a straight roof.

Now as to his statement of "an actual happening on his present job," in which he says he alone and unaided laid 3500 shingles, double-nailed and split 4 inches, in three hours' time. This would require a man's driving 38 8-9 nails each minute of the three hours, and while he is resting he can split his shingles and move along the roof. Try it, boys, and see what you think of it. I think when you have tried this you will have time to smile at this lone man who laid 14,000 quicker than seven men could lay the same number.

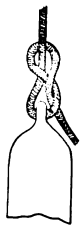
Tools for Rapid Shingle Work.

From H. S. G., *Cedar Falls, Iowa.*—I am a carpenter and builder always ready to learn and get new ideas, and a constant reader of your magazine. I read in the December issue an article from a "Western Builder" about one man laying and nailing 14,000 shingles in one day, or more than seven carpenters working on the other side of the roof. This one man with a three cornered perch and a pin in his hatchet, finished his side of the roof when the seven men had yet four courses to lay. I would like some information regarding this three-cornered perch and pin in the shingling hatchet, as I feel sure many others besides myself are interested in the subject.

Note.—We publish the letter of our correspondent above with the suggestion to "Western Builder" that he send us a sketch and description of the tools used by the workman in question, as we quite agree with our correspondent that the matter will prove of undoubted interest to a wide circle of readers.

Knots for Tying Sash Cord.

From J. M., *Nutley, N. J.*—With reference to the discussion now going on in *Carpentry and Building* as to the best method of tying sash cord, I inclose sketch of a simple hitch which cannot be beaten for economy in time and amount of cord required. When the knot is pressed down against the head of the sash weight it will hold until the cord wears out.



Knots for Tying Sash Cord.

Weather Boarding a Circular Tower.

From R. J. O'B., *Brooklyn, N. Y.*—In putting beveled siding 6 inches wide, ½ inch thick on one edge, ⅛ inch thick on the other, and showing about 4 inches to the weather on a circular tower 10 feet 6 inches in diameter, I find that the boards droop at the ends and they have to be planed off in order to make them come level with

the center, thus forming a very flat segment. I would like to know the rule for ascertaining how much to take off the lower edges of the siding on a length, say, 6 feet long. I do not recall ever having seen any rule for doing this and would be pleased to hear through *Carpentry and Building* from some of the practical readers who are familiar with the subject.

Note.—There are several ways of doing the work in question, and we trust our practical readers will come forward and describe the method they follow in cases of this kind. It, however, may not be without interest to mention the fact that the subject was treated at some length in the issue of the paper for April, 1896.

Mr. Odell's Methods Indorsed.

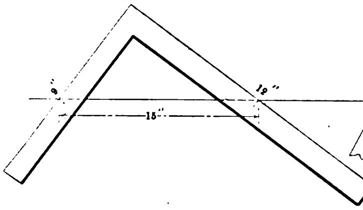


Fig. 1.—Finding Length of Common Rafter.

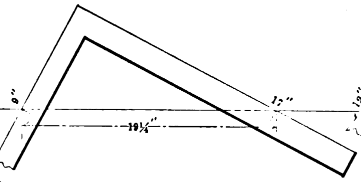


Fig. 2.—Length of Hip or Valley Rafter.

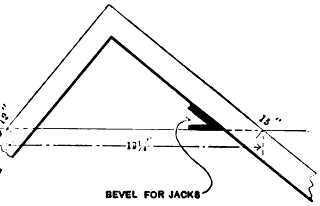


Fig. 3.—Finding Bevel for the Jack Rafters.

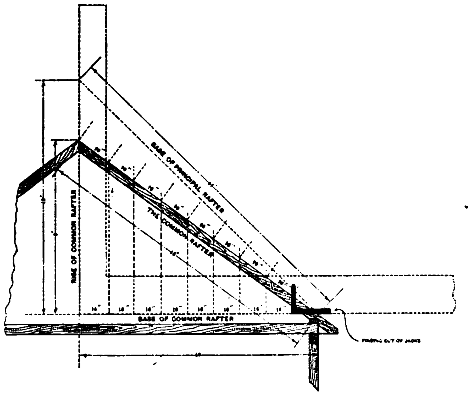


Fig. 4.—The Steel Square Applied to a Building to Find Length of Common Rafter.

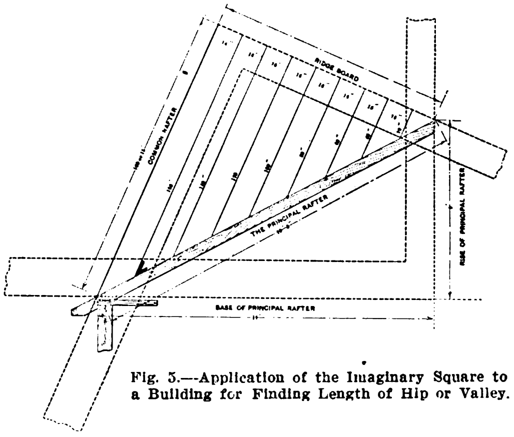


Fig. 5.—Application of the Imaginary Square to a Building for Finding Length of Hip or Valley.

Mr. Odell's Methods Indorsed.—Diagrams Showing Methods of Finding Lengths and Bevels of Rafters.

From L. H. HAND, *Vincennes, Ind.*—It is a far cry from Vincennes to Lincoln, Neb., but I would like to reach out and shake hands with Frank G. Odell, and while I shall perhaps never use the rule he illustrates in the November number of *Carpentry and Building* yet I am sure I shall never forget it. The man who comes onto the job with ideas more than he needs is usually similar to the man who brings a few extra tools in his box. The man with only ideas enough to saw and nail flooring or siding is like the proverbial "jack leg," who attempts to do everything with a hatchet and saw. Now if I had been in Odell's place I should have ascertained whether those six men were working as master workmen or only craftsmen and apprentices. If the first, I should have been tempted to arrange immediately for a new gang; if the other two, I should have called them all from labor and opened up a school of instruction. Just such instances as he describes make a man ashamed of his trade, especially when we note that *Carpentry and Building* has been for sale at news stands for nearly 27 years at 10 cents the copy. I rarely look through the back numbers and find a single one but what would have placed those six men in a position to proceed with their work.

Now supposing these six men cared to know anything about their business: I should have had a straight piece of 2 x 4 laid upon the saw horses and made some such talk as this: "Now, boys, I have before me an ordinary piece of scantling of which I desire to frame a four-gable roof whose width is 24 feet, the rise being 9 feet. In my hand I hold an instrument made of steel. It is 24 inches long on the blade and 16 inches long on the tongue. It is an exact angle of 90 degrees, or the fourth part of a circle. In my mind I have a photograph of this same instrument, which is 24 feet long and the tongue is 16 feet long. I apply this instrument to the edge of the 2 x 4 and produce a right angle triangle, the base of which is 12 inches, the perpendicular 9 inches and the hypotenuse 15 inches. (See Fig. 1.) Now in our minds we apply our gigantic square to the building (Fig. 4) and we find the common rafter to be 15 feet in length. The next proposition being the length of the hip or valley rafters, we will with the same instrument produce a right angle triangle, the base of which is 17 inches, the perpendicular 9 inches and the hypotenuse 19¼ inches (Fig. 2), which by again applying our large imaginary square to the diagonal line across half the building we find gives the length of the hip or valley as 19 feet 3 inches (Fig. 5). The cut along the 17-inch mark is the foot and the cut along the 9-inch mark the plumb cut for the principal rafters. We now produce another right angle triangle with the same tools, the base line of which is 15 inches, the perpendicular 12 inches and the hypotenuse 19¼ inches (Fig. 3). We next apply in our minds the imaginary square to the imaginary building, laying the blade upon the rafter as it stands in the roof, the tongue reaching to the center of the building and the diagonal line representing the center of the hip or valley and giving the cut for the jack rafters in the acute angle and the bevel for mitering the principal rafters in the obtuse angle (Fig. 4). This must be applied to the rafter when it is backed.

"Next, for the length of the jacks, we find by the use of the square that a rafter whose base is 12 inches requires to be 15 inches long, hence a rafter whose base is 16 inches would be one-third longer, or 20 inches, which is the length of the first pair, the next being 40 inches, 60 inches, &c. Now, boys, in conclusion, if you do not see through this thoroughly, go up on top of a four-gabled house before the sheeting is on and think it over again and it will be as clear as a bell to you."

There is one great trouble with *Carpentry and Build-*

ing—the average carpenter won't read it. I have tried to get our men to do so—have given them sample copies, have pointed out special articles, &c., but it is no good. They would not read it if it cost nothing at all.

Device for Cleaning Pipe Sewers.

From F. J. G., *Wyoming.*—I inclose a sketch of a sewer cleaner which is used here at Fort D. A. Russell, the idea being that of Post Plumber John Macdonald. It has been used with good success up to 150 feet. The construction is such that when once in the pipe the joints cannot unlock. The general arrangement and sizes are so clearly indicated in the sketch that detailed description would seem to be unnecessary.

Finding the Capacity of Tapering Tanks.

From T. M., *San Francisco, Cal.*—In a recent issue of the paper a correspondent asked for a rule for measuring the capacity of tapering tanks, and in answer thereto it may be stated that "B. W." can find in geometry, or in almost any arithmetic which includes mensuration, a rule embracing the measurement of any shaped vessel, either in volume or superficial area. It is safe to assert, however, that nine-tenths of those who make use of these rules do not know the principles upon which they are founded, and for this reason they are easily forgotten because not clearly understood. It would require a thorough geometrician to understand the reasons and principles that govern the construction of the rules that are given for the measurement of circular-shaped vessels, cylindrical or cone-shaped tanks, etc.

Seeing, therefore, the necessity of a practical rule, correct in theory, easily understood and simple in its practical application, only requiring a knowledge of simple multiplication and division, I beg to submit the following:

Rule.—To the square of the greatest diameter of circular cross section add the square of the lesser; divide this product by 2, which will give the mean diameter. Divide the mean diameter again by 2 and between the difference and remainder, or the mean diameter and half its area, find a mean proportional, then multiply this proportional by the hight in inches, and we have the volume of the tank expressed in cubic inches.

A table of units of measure can be found in any arithmetic by which the above rule can be reduced to any denomination at pleasure.

Example of Operation.—For the sake of simplicity let us assume that a tank measures at its base 6 feet, diameter at the top 5 feet, and the vertical hight 7 feet. Now to the square of the bottom diameter add the square of the top diameter—thus:

$6\text{ ft.}^2 = 5184$ inches and
$5\text{ ft.}^2 = 3600$ inches,

the sum of the two being 8784 square inches. Now as 8784 gives a uniform diameter throughout, therefore:

$8784 \div 2 = 4392$, the mean diameter.
$4392 \div 2 = 2196$, half the mean diameter.

To find a mean proportional between the mean diameter and half its area, add

$4392 + 2196 = 6588$.

$6588 \div 2 = 3294$, a mean proportional, and 1098 is the difference between the extremes of the proportional or between the mean diameter and half its area, for $4392 - 1098 = 3294$ and $2196 + 1098 = 3294$, hence 3294 is a true proportional between the mean diameter and half its area multiplied by the hight in inches, as

$(3294'' \times 7' \text{ or } 84'') = 266{,}696$ cubic inches.

$266{,}696 \div 231$ for gallons is equal to 1111, 5-21 gallons.

This rule is applicable to all cylindrical-shaped vessels whether their sides be vertical or uniformly inclined. If the diameter of the vessel is uniform throughout, then find a mean between the square of its cross-sectional diameter and half its area and proceed as before.

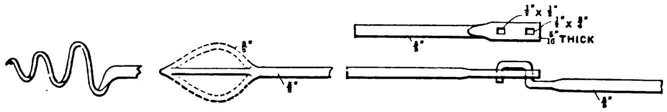
Cause of Creosote in Chimneys.

From A. D. C., *Johnsonville, N. Y.*—What is the cause of so-called creosote running down chimneys and often spoiling wall paper and ceilings, as well as the patience of the occupants of the house? If there is any preventive for this I wish some brother carpenter would tell me through the correspondence columns of the paper.

Note.—The trouble may be due to any one of a variety of causes, but as our correspondent does not specify the conditions of any particular case it may be stated in a general way that the formation of creosote, so-called, is due to condensation in the chimney flue of the gases arising from the products of combustion. This condensation is produced by the products of combustion from the stove or furnace passing over the surface of the chimney flue so slowly as to become cooled before they escape at the top, and then it runs down in such a way as to ofttimes cause discoloration of walls and ceilings. The trouble is often overcome by increasing the draft so that the products of combustion enter the chimney at a higher temperature and at a greater velocity. With this much said however we shall be glad to have our readers give the correspondent above the benefit of their experience in connection with the trouble mentioned.

Pressure of Grain in Bins.

From E. B. Noyes, *Portsmouth, Va.*—Some time since there was a query in *Carpentry and Building* as to the pressure of grain in bins, and recently there appeared in *Engineering News* a very valuable paper on this subject, giving the results of experiments on a full size elevator bin and also on small experimental bins. In general it was determined that a large proportion of the weight was carried by the bin walls, the relative amount increasing as the depth increased, and depending on the coefficient of friction between the bin walls and the contained material, and also on the internal friction of the contained material. The amount of moisture contained in the grain, or even the difference between a damp and a dry day, has considerable influence on the coefficient of friction. The following are given as safe values for standard wheat:



Device for Cleaning Pipe Sewers.

Wheat on wheat	0.532
Wheat on steel trough plate bin	0.468
Wheat on steel flat plate, riveted and tie bars	0.375 to 0.400
Wheat on steel cylinders, riveted	0.365 to 0.375
Wheat on cement-concrete, smooth and rough	0.400 to 0.425
Wheat on tile or brick, smooth or rough	0.400 to 0.425
Wheat on cribbed wooden bin	0.420 to 0.450

Taking the angle of repose of wheat at 28 degrees the ratio of lateral to vertical pressure will be as 1 to 0.6, and selecting 0.41667 as the coefficient of friction of wheat on bin walls (to simplify the calculation, because $0.6 \times 0.41667 = 0.25$); taking also a bin 10 feet square, in which the horizontal area is 100 square feet, and the area of the four walls for 1 foot in depth is 40 square feet, and, lastly, taking the wheat to weigh 50 pounds per cubic foot, or 5000 pounds for each foot in depth of the bin, the following method of calculation is given:

The first foot is assumed to be carried at the top of the second foot, since the side friction is so small it may be neglected. For the second layer we have $\frac{5000 \times 40}{100} \times 0.6 \times 0.41667 = 500$ pounds carried by the walls. Then $5000 - 500 = 4500$ and $4500 + 5000 = 9500$ pounds carried at top of third layer. For the third layer we find $\frac{9500 \times 40}{100} \times 0.6 \times 0.41667 = 950$ pounds carried by the walls, and $5000 - 950 = 4050$: $4050 + 9500 = 13{,}550$ pounds at top of fourth layer, &c.

To determine the pressure per square foot or per square inch, take as an example the third layer: 950 pounds lateral pressure is carried by 40 square feet, hence $\frac{950}{40} = 23\frac{3}{4}$ pounds pressure per square foot, and this divided by 144 will give the pressure per square inch.

So at the bottom of the third layer $\frac{13,550}{100} = 135\frac{1}{2}$ pounds pressure per square foot = 0.94 pounds per square inch.

The table at the end of this summary was computed in the above manner and agrees fully with the results of the tests. Corn, at 45 pounds per cubic foot, gives approximately the same pressures as wheat; peas, weighing 50 pounds per cubic foot, give pressures 20 per cent. greater than wheat; flax seed, weighing 45 pounds per cubic foot, gives lateral pressures 10 per cent. greater and a vertical pressure 12 per cent. greater than wheat. These differences are due to differences in the angles of repose and in the coefficients of friction.

Bin 10 x 10 feet, 80 feet deep. Lateral pressure = 0.6 × vertical pressure. Weight of wheat, 50 pounds per cubic foot. Angle of repose. 28°. Coefficient of friction between grain and bin walls = 0.41667.

	Total	Carried by sides.		Carried by bottom.		Pressure per square inch.	
Depth of grain.	weight in bin. Pounds.	Per foot. Lbs.	Total. Lbs.	Per foot. Lbs.	Total. Lbs.	Lateral. Lbs.	Vertical. Lbs.
1....	5,000	000	000	5,000	5,000	0.00	0.35
2....	10,000	500	500	4,500	9,500	0.21	0.67
3....	15,000	950	1,450	4,050	13,550	...	...
4....	20,000	1,355	2,805	3,645	17,105	...	...
5....	25,000	1,720	4,525	3,280	20,475	0.72	1.43
6....	30,000	2,048	6,573	2,952	23,427	...	...
7....	35,000	2,343	8,916	2,657	26,084	...	...
8....	40,000	2,608	11,525	2,392	28,475	...	...
9....	45,000	2,848	14,373	2,152	30,627	...	...
10....	50,000	3,063	17,436	1,937	32,564	1.28	2.28
15....	75,000	3,856	35,296	1,144	39,704	1.61	2.78
20....	100,000	4,325	56,080	675	43,920	1.80	3.07
25....	125,000	4,601	78,591	399	46,409	1.92	3.25
30....	150,000	4,764	102,120	236	47,880	1.99	3.35
35....	175,000	4,861	126,252	139	48,748	2.03	3.41
40....	200,000	4,918	150,740	82	49,260	2.05	3.45
45....	225,000	4,952	175,487	48	49,563	2.06	3.47
50....	250,000	4,971	200,258	29	49,742	2.07	3.48
55....	275,000	4,983	225,152	17	49,848	2.08	3.49
60....	300,000	4,990	250,090	10	49,910	2.08	3.49
65....	325,000	4,994	275,058	6	49,947	2.08	3.50
70....	350,000	4,997	300,032	3	49,968	2.08	3.50
75....	375,000	4,998	325,019	2	49,981	2.08	3.50
80....	400,000	4,999	350,012	1	49,988	2.08	3.50
Maximum........		5,000		0	50,000	2.08	3.50

For deep bins the opening should be central at the bottom of the bin, since a side opening throws much heavier pressures than the above against the side opposite the opening.

Finding Angles of Gambrel Roofs of Different Spans.

From FRANK M. HAMLIN, *Lake Villa, Ill.*—I have been requested by personal letter from an old reader to explain how the method shown in the November number of the paper would work on roofs of different spans, and I therefore present a sketch indicating that the proportions of the roof are not affected by the change of span. It also indicates that the cuts of the rafters when once obtained will always be the same on any roof with a span in feet and inches, it being only necessary to divide the span into 24 equal parts, &c. If the proportion given does not suit the eye it may be altered by dividing the width into more or less parts, as the case requires, using of course one of the parts to obtain the center for the half circle.

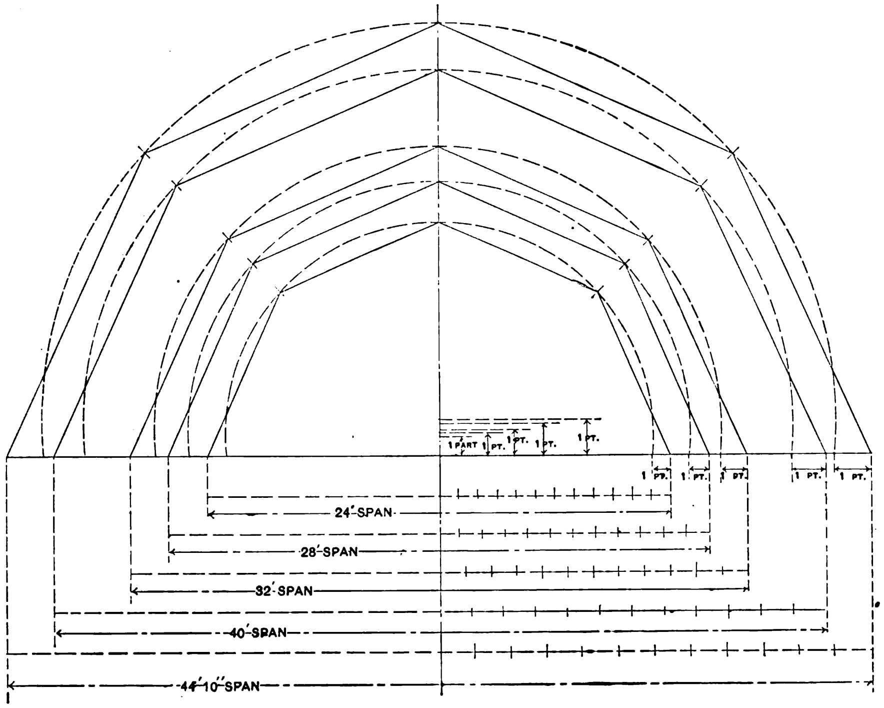


Diagram Showing Manner of Locating the Angles of Gambrel Roofs of Different Spans.—Scale, ⅛ inch to the Foot.

Estimating Cost of Work on a Building.

From J. K. E., *Greeley, Colo.*—I am much interested in *Carpentry and Building* and consider it of great benefit to builders. The Correspondence Department is an excellent medium for the interchange of ideas, and I would like to have some of my brother carpenters and contractors furnish data by which they arrive at the cost of any particular work on a building. In order that it may be of the most value, the time required to do any given piece of work, such as the framing and putting up of any given number of feet of material, would need to be stated, as wages vary materially in different parts of the country.

Note.—With no desire to anticipate the interesting comments which we feel sure our practical readers will furnish in reply to this correspondent, we would suggest that he obtain a copy of some good book on estimating, as it will give him in detail just the information he requires. Some time since we published in these columns a series of articles on estimating the cost of houses, and later the matter was put into book form and issued under the title of "Estimating Frame and Brick Houses," copies of which can be had through this office at $1 each, postpaid.

TURNING FACE WORK.*

By C. Tobyansen.

THE sash bar shown in section and elevation in Fig. 14 offers a somewhat different problem owing to the fact that it is turned both sides. The use of the bar is clearly indicated at A of the elevation. If we have several of these to make it is well that the stuff be planed to exact thickness, as it saves labor and additional measuring in the lathe. Having circled them out on the band saw, we fasten them on the lathe on the center screw plate the same as the door molding and turn one side first of whatever number we may have in hand, cutting them clear through at H H of the section, taking care to cut squarely in. We now have a number of rings turned on one side, presenting the appearance indicated by C of the section. It will be noted that the block E fastened on the screw plate D just fits the putty recess of the bar. Having it thus fastened, we can now proceed to turn the face mold and procure the finished article shown at B just above the elevation. The putty recess and the little fillet on the face of the mold should line up true, as indicated at F F. If this is not the case, the coping on the end of the meeting bars in the sash will not fit properly.

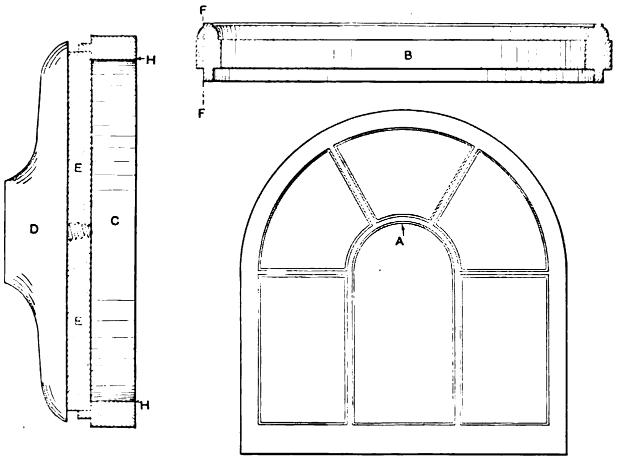
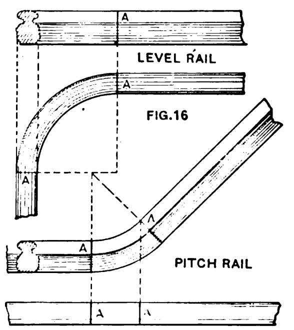


Fig. 14.—Details of Turned Sash Bar.

The next subject for consideration is the turning of rail segments. In Fig. 15 of the drawings is shown a turned level rail with top and side views indicated in Fig. 16. The springing lines or points where it meets the straight rail are at A A. If the circle is fairly large—say, 12 inches or so in diameter—it can be turned in one operation—that is, one fastening on the face plate with screws from the back, as suggested at S S of Fig. 15. This is necessary, owing to the fact that the circle is cut all the way through, leaving no wood in the center. If, however, the circle is small, rendering access of cutting tools into its interior difficult, it is far better to turn half way in to the shoulder B and then refasten on a block on the center screw plate, as indicated at A of Fig. 17, thereby giving free access to the beaded portion, or it may fit into a hollow chuck large enough to inclose it. The pitch rail shown in Fig. 17 and with side and top views in Fig. 18 must next be turned on one side first and reversed to turn the other side, thus finishing the job, as shown in the sketch. All of these operations demand skillful management in order that the two sides of the rail may match properly and accord truly with the straight rail.



Figs. 16 and 18.—Level and Pitch Rails.

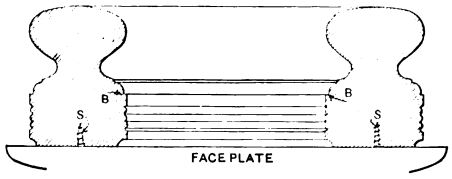


Fig 15.—Turned Segment for Level Rail.

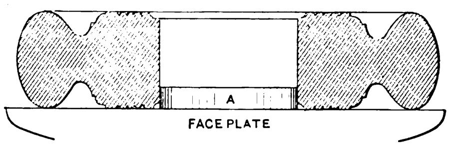


Fig. 17.—Turned Segment for Pitch Rail.

Turning Face Work.

The rail section shown in Fig. 19 is of different proportions, the pattern being out of balance, as we call it—that is, the two sides are unlike so far as concerns the upper mold. In all rail turnings templets, as at B and C, will be found of great assistance on the plain upper portion, and I have chosen this pattern for the purpose of indicating the manner of application. A piece of very thin hardwood ⅛ inch or less should be carefully marked after the piece of straight rail we want to match and then shaped on the band saw, cutting closely to the lines with a fine saw. If the rail is alike on both sides one templet is sufficient; if unequal, as in Fig. 19, we will need two. In the case of this pattern mark the abutment points on the templet, as E and D, and also corresponding marks on the rail. Cut the surplus wood away little by little until the templet rests evenly with the abutment marks and fits closely all around. Strike a pencil line around the mold at the point G at the extreme point of the templet C. This gives one abutment point for the templet B, the other being at F. This completes the mold, and if due care has been exercised it should and will match the straight rail perfectly.

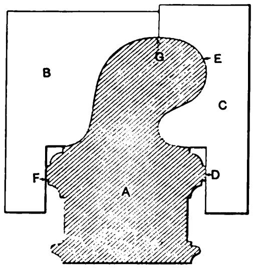


Fig. 19.—Section of Rail, Showing Use of Templet.

These many little pointers may seem superfluous to the average reader, but the turner who has been, to use

---

* Continued from page 345, December issue.

a slang expression of the day, "up against it" in the jobbing shops will take a different view of the matter, and we therefore trust that what we have had to say may be of assistance. Should any of the readers in the turning line have any "wrinkles" to offer I should be pleased to hear from them through the Correspondence Department of the paper, as an exchange of ideas is always helpful, not only to those directly interested, but to the general reader as well. No one man ever knew it all in any one line of business; we are ever learning, inventing and discovering, hence progressing. The "wrinkle" which may seem commonplace and simple to one person may have escaped his neighbor and be of much service to him, for no man's candle ever shown less brightly because he lit his neighbor's light. So, we repeat, if any one has suggestions to offer bring them forth. We are all learners in the school of life with its thousand needs, and who shall call himself the teacher? Not, indeed, yours truly, the writer.

◆

Mission of the Veneer Machine.

The mission of the veneer machine is to make thin lumber. This is short and sounds simple, but it really covers a wide field and is becoming a very prominent branch of the wood working industry, says a writer in a recent issue of the *Hardwood Record.* In the earliest days of the veneer machine its mission was almost exclusively to make very thin lumber from rare and valuable woods to use as a face or covering of woodwork of various kinds, generally cabinet work, but including also interior trim on houses, ships, railway carriages, etc. Later when the need for baskets and other light packages became so large in volume that it could not be supplied by the hand-made products of the time the veneer machine made its entrée into the light package world with such marked success that for a time it looked as if its greatest mission was in the field of baskets and light packages. Its work in this field has continued to increase and is now more extensive than ever before; but of late years other lines of work that are growing in prominence probably overshawdow the basket industry.

The greatest mission of the veneer machine at present and in view of the prospects in the future is in the manufacture of thin lumber, ranging in thickness from 1-16 inch to ⅝ inch. The call for this lumber comes from furniture manufacturers, cabinet workers of all kinds, planing mills which manufacture interior house finish and a number of other industries entirely apart from box and crate manufactures which are to some extent in the same class as basket and other package industries. Package manufacturing is or ought to be, in point of volume, the greatest field for common veneer, as this industry has not only grown to enormous proportions but is one in which the greatest quantity of the lumber needed can be advantageously made on the veneer machine. The advantages come from several different points. In the first place the veneer machine saves the waste in sawdust incident to making thin lumber on a sawmill, which is a big item in itself; the stock from the veneer machine can be cut to exact lengths, thus saving the expense of cross cutting, and the stock is smooth and does not require the work of the planer as does sawed material, which is a saving both in time and timber. There are some disadvantages, of course, one of which is that veneer lumber has a tendency to warp, and on account of this it is customary to make at least the ends of boxes and crates out of sawed stock. However, the veneer machine will undoubtedly in the future furnish the great volume of box and other package material. And this volume, if it keeps up its present gait, will be of such magnitude as to overshadow any other branch of the veneer business in point of quantity at least.

The most interesting field of work for the veneer machine is the manufacture of thin lumber for furniture and cabinet wood work and other uses along the same line. The use of thin lumber in this work is increasing at a rapid rate and appears to be growing solely on its merits, so that its future prominence is practically assured.

In drawer bottoms and many inside and back panels there is a great call for plain thin lumber made of almost any kind of hardwood timber which, if made in a sawmill, would prove practically as expensive as thicker stuff, while the veneer product can be had at a very much lower figure and answers all purposes fully as well as sawed stock. Then, in the making of large panels, whether they are to be plain or faced, we find veneer offers a decided advantage, several advantages in fact. By making it in built up form—that is, gluing two or more pieces of veneer together, panels of almost any size can be made, whereas if some of them were to be made of lumber it would take the widest stock to be found, which would naturally be very expensive, while veneers can be manufactured from ordinary logs that will make panels of any size desired for ordinary use. In fact, when it comes to such work as billiard table tops there is no other means except by the use of veneers by which one can get a solid face of wood without joint large enough to answer the purpose. Of course lumber from the giant trees of the West Coast would fill the bill, but here in the Mississippi Valley we have no such timber, and besides there is no strenuous call for it when one can take a poplar, cottonwood or gum log of ordinary size and get a sheet of veneer for this purpose without any great trouble.

Another advantage offered by this built up lumber is economy in timber. That is, panels of built up wood can be made thinner than the same panel of solid wood and still have the same or even greater strength. This, of course, is not a very big item in one or two panels or in a piece or two of furniture, but when we consider all the panels used in furniture and cabinet wood work it is an item of large proportions. Considering the fact that such wood work is subject to damage by moisture, the panels are much better in that they do not warp or crack like solid wood. A panel of built up wood in which the grain is crossed retains its shape much better than solid wood both as to size and surface level. When to all this we add the fine face veneer which has become a necessity owing to the scarcity of woods from which this class of material is produced we have a piece of work of which any mechanic may well be proud.

◆

Fewer Strikes by British Labor Unions.

Figures published in recent weeks by the Labor Department of the British Board of Trade indicate a lessening of strikes by labor unions. In some particulars the record is quite remarkable. It shows that disputes between unions and employers numbered only 334 in 1904, as compared with an average of more than twice that number for each of the preceding ten years. The number of workmen involved in such disputes was 83,922 in 1904, while it was more than twice that number in each of the preceding ten years. The aggregate number of days lost from such causes in 1904 was 1,416,265, while for each of the six years ending with 1898 an average of more than 12,000,000 days were lost through strikes and other labor contests.

◆

THE carpenters' strike, which began in Glasgow, Scotland, on April 10 of the current year and was due to the proposal of employers to reduce the rate of wages from 10 to 9 pence per hour, has been settled through compromise. The agreement between the Master Wrights' Association on the one hand and the Associated and Amalgamated Societies of Carpenters and Joiners on the other is to continue one year from the first of July, and during that period the rate of wages shall be 9½ pence per hour. Both parties agree that in future the framing of the year's by-laws shall be placed in the hands of a Conciliatory Board, which board shall also pass upon any trouble that may arise during any year in regard to the interpretation or carrying out of the by-laws. It is further agreed that no stoppage of work take place pending the decision of this board on any points, and its decision when given shall be binding on both parties.

WHAT BUILDERS ARE DOING.

REPORTS from leading centers of the country show a vast amount of work to be still in progress, the valuation of the improvements in the aggregate running far ahead of this season last year. Phenomenal gains are noted in many of the smaller cities, but this does not mean that the larger ones are not fairly holding their own. Indications are altogether favorable for a continuance of this activity, more especially as the winter thus far has been "open," permitting of outside work to be carried forward without serious interruption. Taking the country over the labor situation is most gratifying and it is only here and there that there is any great amount of interruption to building projects. As the year draws to a close builders throughout the country have just cause for satisfaction with the results which have been accomplished.

Buffalo, N./Y.

There appears to be no cessation in the volume of building operations in progress and preparations for new work continue upon a scale which indicates plenty of work for mechanics in all branches of the trade. During the month of November the Bureau of Building issued 174 permits for improvements estimated to cost $668,865, while in the same month of 1904 the value of the building improvements amounted to $484,280. Among the municipal work now under way is the new hospital building, a new school house and a new pumping station.

Chicago, Ill.

Building for November in so far as the number of structures is concerned made a handsome gain over the corresponding period a year ago, but there was a slight decrease in the cost, amounting to a little over $500,000. During the month just closed permits were taken out for 830 buildings, with a frontage of 23,187 feet and involving a cost of $5,099,600, against 631 buildings, 19,990 feet of frontage and a cost of $5,785,150, an increase of 199 buildings and a decrease of $685,550, as compared with the corresponding month a year ago. The record of building operations for the 11 months of the year, however, shows a handsome increase over the corresponding period a year ago. During the 11 months permits were taken out for the construction of 7889 buildings, involving a cost of $57,754,870, as compared with 6772 buildings and $41,570,940 for the corresponding period a year ago, showing an increase of 1117 buildings and an increased cost of $16,183,930.

Cleveland, Ohio.

The result of the annual election of officers by the members of the Builders' Exchange was the selection of W. B. McAllister for president, H. C. Bradley for vice-president, Edward A. Roberts for secretary and F. G. Hogen for treasurer.

In the report of the Board of Directors the more important work accomplished by the Exchange during the past year was reviewed, and this was in a way supplemented by the annual address of President McAllister. Among other things he called attention to the high standard of the work of the Exchange, made possible through the united efforts of the members, and also to what he considered as a great menace to the building industry of the city—the restriction of the rights of young men to learn a trade. In his opinion building operations in the city had been retarded to a considerable degree by the scarcity of skilled mechanics, coupled with an additional restriction as to the amount of work to be done in a day. He thought there was a good field in which the Executive Board might labor in overcoming this, and his remedy was the establishment of a trade school, as had been suggested by the Mason Contractors' Association. Such a school, he thought, might be operated at moderate cost, while the benefit was sure to be found in the stimulating of industry and the improvement of conditions.

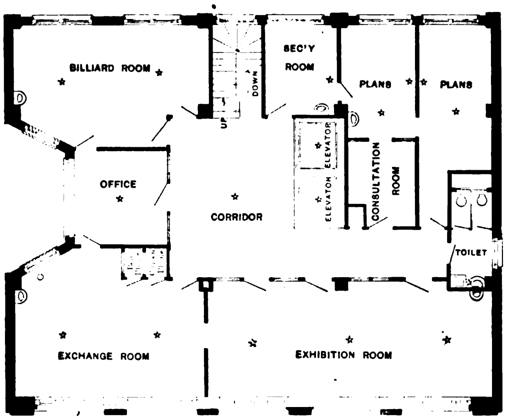
It was decided at the meeting to raise the initiation fee for new members to $50, as against $25 as heretofore. The business meeting was adjourned at 9 o'clock and the members repaired to the Chamber of Commerce Café for the annual dinner.

Columbus, Ohio.

The members of the Builders' and Traders' Exchange are actively engaged in moving into their new quarters in the Brunson Building, at 145 North High street, where the entire seventh floor has been leased and put in shape to meet the requirements of the organization. It is expected that everything will be installed by the first of January, and the name of the edifice will then be changed to the Builders' Exchange Building. The exhibition room has been fitted up so that it is among the finest of its kind in the country, affording an excellent opportunity for the display of all kinds of building materials. The new structure is so located that every street car line passes the door, and being in the very business center of the city the management expects to have at least 50 people visit the Exchange daily to every one which visited it in the old quarters.

With a view to affording the readers an idea of the arrangement of rooms which has been adopted by the Exchange we present herewith a floor plan showing the relative position of the exchange room, the exhibition room, the plan rooms, consultation room, secretary's office, billiard room, &c. The building is rapidly filling up with architects, contractors and material dealers, and will soon contain more people connected with the building industry than any other structure in the city.

We learn from Secretary R. J. Gardiner that the Exchange is in a very flourishing and prosperous condition. It is nine years next February since the Exchange moved from their underground quarters in the Board of Trade Building to 71½ East State street, which was at that time considered a "modern structure," and was perhaps the best and most commodious building in Columbus suitable for the purpose of the Builders' Exchange. Since then, however, wonderful progress has been made in the equipment and conveniences of office buildings, and with a view to keeping abreast of the times the management of the Exchange recently decided to lease new quarters, as above mentioned, in the Brunson or Builders' Exchange Building, on North High street.



Floor Plan Showing New Quarters of Columbus Builders' and Traders' Exchange.

Los Angeles, Cal.

Building in Los Angeles is not as active as it has been for a number of months past, the building permits issued during November showing a decided drop as compared either with the month previous or with the month of November, 1904. The permits for November were 843, with a total valuation of $1,259,265, as compared with 695 permits, aggregating $1,534,152 in value, for the month of November, 1904. There is a decided lack of large and expensive structures in the work now being undertaken, and the average value of the permits issued during the month is considerably lower than was the case a year ago. There has, however, been a considerable increase in smaller buildings, particularly in one-story frame dwellings. Contractors do not anticipate any great falling off in the construction of dwellings and the smaller class of business blocks during the winter, though it is possible that the absence of permits for large steel frame structures may cause the building records to show a considerable falling off. There is still a shortage in some lines of material, particularly in concrete. Lumber is, however, plentiful and prices are moderate. The labor situation is about as heretofore, with no particular surplus of help to be had.

Montreal, Canada.

The annual banquet of the Builders' Exchange at Montreal occurred on the evening of December 7 and was in every way a great success. Covers were laid for 150 and the *menu* was all that could be desired. Among the notable addresses may be mentioned that of W. E. Doran of the Harbor Commission, who spoke on behalf of the architects of the province and who suggested that a Conciliatory Board be formed of architects to consider all questions of dispute arising between builders and their employees; also that of J. S. Archibald, president of the Province of Quebec Association of Architects, in which he dealt with the action of the fire underwriters and with the building laws of the city. During the evening there were vocal and instrumental music, recitations, &c.

New York City.

Outside of the trouble resulting from the strike of the iron workers against Post & McCord the local building situation presents few features for comment. Operations are being conducted upon a fairly normal scale, the greatest activity naturally being in the Boroughs of Brooklyn and the Bronx, where a veritable boom has been in progress the past season. The value of the building improvements is far in excess of that for the corresponding period the year before, and the general feeling prevails that the spring will witness a continuance of this activity should no serious labor troubles intervene. Up to December 1 permits had been issued in the Boroughs of Manhattan and the Bronx to the number of 4484, calling for an outlay of $152,000,000, while in the first 11 months of 1904 there were 2820 permits issued for improvements valued at $90,340,000. In the Borough of Brooklyn the value of the new buildings for which permits were issued up to December 1 was $63,160,000, as against $35,756,250 in the corresponding period of 1904.

Twenty-four of the 32 unions in the New York building trades working under the arbitration agreement with the Building Trades Employers' Association voted with the employers to suspend the Housesmiths' and Bridgemen's Union after its officers had refused to order the men back to work on Post & McCord buildings pending arbitration. These 24 unions are thus committed to the action of the Employers' Association in putting nonunion men at work on these buildings. In carrying on the campaign against the striking union the employers have started an employment bureau, which will be operated under the name of the Allied Iron Association. Notice was given that after December 8, 1905, all iron workers seeking employment must apply at the new bureau instead of being put to work by union foremen.

As announced in our last issue as likely to be the case, an agreement has been reached between the bricklayers' unions of Greater New York and the Mason Builders' Association, which will go into effect January 1 and continue in force for two years. By this agreement the present wages of 70 cents an hour will be maintained and the men will receive double wages for overtime and for work done on Sundays and legal holidays. Contrary to general expectations the agreement was continued with the fire proofing clause inserted, which is to the effect that the work of installing fire proof brick partition walls, arches and floors cannot be sublet.

The first general meeting of the Concrete Association of New York was held in the rooms of the Building Trades Employers' Association on Friday evening, December 8. It was called for the purpose of receiving the report of the Committee on Constitution and By-laws, which was adopted with some amendments. The officers of the association are: President, Ross F. Tucker of the Tucker & Vinton Company; vice-presidents, H. C. Turner of the Turner Construction Company; H. C. Miller of H. C. Miller & Co., and W. W. Benson of the Standard Stone Company; secretary, F. G. Barr of the Vulcanite Cement Company, and treasurer, Ronald Taylor of Ronald Taylor & Co.

Philadelphia, Pa.

Climatic conditions during the past month have been unusually favorable for building operations, for there has been but little freezing weather and work has not been interfered with to any marked extent.

The large amount of building under way is being pushed forward with rapidity and the trade is generally satisfied with existing conditions.

Building permits numbering 622 were taken out during November for work estimated to cost $2,699,766, covering 1090 operations, and while the number of permits was not as large as those for the month of October the estimated cost of the work is greater by more than $700,000.

During the past 11 months of the year 8480 permits, for 16,253 operations, have been taken out for work to cost $33,756,795, as compared with 8874 permits for 13,666 operations at a cost of $27,617,675 for the corresponding period during 1904. The statistics for the past 11 months show the highest record for that period in the history of the Bureau of Building Inspection and exceeds the best records for any previous full year by over $1,000,000, that of 1902 being the highest heretofore, when the total cost aggregated $32,509,575.

Operation work continues to be the leading feature, permits for two, three and four story dwellings aggregating $1,008,620 during the past month. The largest individual permit during November was for a bank building for the Girard Trust Company, to be erected at the northwest corner of Broad and Chestnut streets. This building is to be five stories high, constructed of marble and brick and is estimated to cost $900,000.

Considering the season, there is still a good demand for building. The labor situation is generally good and skilled mechanics of nearly all classes are in demand and in some branches of the trade are hard to get.

The Master Carpenters' and Builders' Association of Philadelphia passed the following resolution in reference to wages of journeymen carpenters at a meeting held Tuesday, December 5:

"Be it resolved that on and after May 1, 1906, the wages of 45 cents per hour shall be paid to journeymen carpenters in the County of Philadelphia who are not members of any organization associated with the Allied Building Trade Council or any other organization pledged to what is known as the sympathetic strike."

The prevailing rate of wages in the County of Philadelphia has been 40 cents an hour. About two years ago the journeymen carpenters demanded an advance to 50 cents per hour, but this was not granted, a compromise being offered at 45 cents an hour by the master carpenters and builders, which was refused by the journeymen, who went on strike, but eventually returned to work at the old rate, which has since been in effect.

The above resolution, the master builders and carpenters say, is not the result of any intervention on the part of organized labor, but was passed in good faith for all mechanics to whom it applies.

Portland, Oregon.

Portland is having a continued period of prosperity, notwithstanding the predictions of a slump after the close of the Lewis and Clark Exposition. A good class of buildings has been erected of late, and there are now metropolitan aspirations, a 14-story building having been planned by Russell & Blyth on a lot 50 x 100 at the northeast corner of Sixth and Stark streets. A ten-story building is proposed to be erected by I. B. Yeon, covering a quarter block at the northwest corner of Fifth and Alder streets. The Grand Lodge of Masons will erect a new temple at West Park and Yarnhill streets. The advent of the rainy season, which usually tends to check building operations here, has apparently been without effect this year, as more permits have been issued since the rains of a couple of weeks ago than were issued previously. There appears to be a shortage of modern office buildings, and, according to the plans now in the hands of the architects, the next few months will see a number of large buildings undertaken. Residence building has continued about as heretofore, though contractors generally anticipate a postponement of many residence projects until after the winter season.

Contractors are better satisfied with the outlook in the material and labor markets than for some time past. There is now a good supply of almost all materials except cement, and even this shortage is expected to be overcome before the winter is gone. The labor supply is ample for requirements, although there are few idle men reported.

Rochester, N. Y.

The official building report for the month of November shows an appreciable gain in the value of the building improvements as compared with the same month in 1904. Many additions to manufacturing plants are under way, but by far the bulk of the operations consists of new residences, of which a number of handsome and costly ones are in course of construction. The total building operations for the 11 months of the year are valued at $4,813,807, while for the 12 months of last year the total valuation was $4,225,927, thus giving a gain for the 11 months of this year over the whole of last year of $587,880. Present indications warrant the belief that the present will be the record year in building, as it is expected that the grand total will easily run above the $5,000,000 mark.

San Francisco, Cal.

The building situation in San Francisco and vicinity is fairly satisfactory, as is evidenced by the amount of work under way and the large volume of jobs being figured on in the architects' offices. The predominating features of the work under way are fine residences, office structures and other large buildings of a speculative nature. There is still a large demand for building materials of all kinds, although the first heavy rains have come and will relieve the building situation somewhat. The supply of cement is still inadequate to the needs, although large quantities of foreign cement are on the way here. The few cement factories in this State are having difficulty in making deliveries on account of a shortage of cars. The lumber situation shows an improving tendency, as the fir mills of Oregon and Washington cannot get a good supply of cars to ship lumber East and will be likely to fill orders for the San Francisco market more promptly in future. Redwood lumber is in fair supply, although there is a large Eastern and foreign demand. There is a good supply of brick and fair deliveries of steel are made. The building of expensive flats has been checked, the banks having ceased to lend money for their construction, fearing that such enterprises would be overdone, to the detriment of business. Among the new buildings projected in San Francisco is a new Masonic temple, costing over $1,000,000, and a $450,000 building for the Lowell High School.

Seattle, Wash.

In spite of the fact that the rainy season is at hand there seems to be no diminution in the letting of contracts

or the planning of new work. There is expected to be a slight easing off in the building of residences and other smaller structures, owing to the winter season, but the increase in the construction of business buildings and office structures more than offsets the falling off in other lines. The architects are busy and a number of buildings of large size are to be commenced early next year. The Seattle Natatorium Company is planning to erect a handsome natatorium on the corner of Fourth avenue and University street at a cost of $100,000. Other work for which contracts will be let within the next few weeks include a new church on Howe street and a new two-story building for the Seattle Turnverein.

St. Paul, Minn.

The members of the Builders' Exchange held their annual meeting the first week in December, when a number of interesting reports, including those of the president, treasurer and secretary, were presented. The work of the Exchange for the past year was reviewed by the president and suggestions were presented looking to an extension of the sphere of usefulness of the organization.

The election of officers resulted in the following choice: President, J. F. McGuire; first vice-president, C. M. Power; second vice-president, G. V. Whitehead; treasurer, William Rhodes, and secretary, A. W. Williams.

Preliminary arrangements were made for the annual dinner of the Exchange, which will be held some time in January.

Tacoma, Wash.

During the month of November 109 building permits, aggregating in value $229,885, were issued in this city. This shows an increase over the number of permits issued during the same month last year, although the aggregate value was somewhat less owing to one or two unusually large permits, which were taken out a year ago. Contractors do not anticipate a very active season during the winter, as there is usually a falling off in almost all lines of construction at this season. It is, however, announced that several store and office buildings will be undertaken before the spring season opens. These include a $35,000 reinforced concrete building to be erected by Eugene Levey of Seattle, on C street, and a $16,000 church to be erected at the corner of North Twelfth and J streets. The contract for the latter has already been let.

Wilmington, Del.

Building operations have been conducted upon an unusual scale this season and houses continue to be in lively demand. Contractors have been complaining of the lack of skilled labor, more particularly of lathers and plasterers, although bricklayers have not been overplentiful. The demand for small houses is an important feature of the situation, and it is estimated by Building Inspector W. M. Connelly that on the first of December not less than 250 buildings were in course of construction throughout the city. The value of building improvements projected during the month of November was double that for the corresponding period of last year, and if the weather continues favorable it is expected that December will prove to be the banner month of the year.

Notes.

One of the centers of building activity is Omaha, Neb., where for November the value of the building improvements undertaken was $406,250, while in the same month in 1904 the amount of work in progress was valued at only $74,735. For the 11 months of the year the figures stand $4,058,264, as against $1,993,295 for the same period in 1904.

The building boom which struck Wilkes-Barre, Pa., the past season has continued unabated and permits for improvements are being taken out in sufficient numbers to warrant an active spring trade. The majority of the new buildings for which permits have been granted will be moderate sized dwellings, each measuring about 16 x 46 feet and fitted with all modern improvements.

The value of the building improvements for which permits were issued in November in Davenport, Iowa, was with one exception greater than that for any month in 1905.

Building statistics for Milwaukee for the month of November show a marked increase in value over the same month a year ago, a total of 299 building permits for the construction of buildings valued at $858,325, as compared with 257 permits valued at $606,447 in 1904. During the 11 months of the present year 4035 permits have been issued, with a total value of $8,833,993, which is an increase of $1,500,000 over the same period a year ago.

The question of improved building regulations is at present being agitated in Washington, D. C., more especially as relates to light and ventilation of new buildings. The proposed regulations provide that buildings designed for habitation shall be so constructed as not to occupy more than 90 per centum of a corner lot and 75 per centum of an inside lot, except when lots abut on alleys, when the alley space may be taken into account. The section provides that rear yards must extend across the entire lot. The depth of this yard must be not less than 9 feet, which is to be increased when buildings rise to a hight of more than 20 feet, after a sliding scale. Even where an alley exists back of a lot an open space of at least 5 feet must be left. All the provisions of the section seem to have been well considered and their adoption will make to the decided advantage of the building interests of the city.

What is said to be the greatest building boom in its history has been experienced this season at Hempstead, Long Island, N. Y. Contracts are about being made for the erection next year of several hundred houses, these to be put up in the central portion and on the outskirts, where land companies have sold hundreds of the lots purchased during the current year. An unprecedented building boom is also prevailing in Valley Stream and along the south side, east to Freeport. Several hundred houses have been erected in the various villages within the territory mentioned, and by next spring an equally large number will have been completed. Contractors and builders have been utilizing all the mechanics available and the supply is scarcely sufficient to meet the demand. The utilization of numerous desirable sites for the hundreds of new houses in course of erection is giving a steady increase to land values.

Fire Proof Hospital Building in San Francisco.

The new German Hospital at Fourteenth and Noe streets, San Francisco, will be the first strictly fire proof hospital building on the Pacific Coast. The ground plan of the structure is in the form of the letter H, the two six-story wings extending east and west, the connecting section being the administration building of five stories. The work now in progress contemplates the erection of the south wing and administration building at a cost of about $400,000. The north wing, which is almost a duplicate of the south, will be built when needed. The buildings, designed by Architect Hermann Barth, are of steel frame construction, with pressed red brick walls, trimmed with yellow terra cotta sills, lintels and cornice. The floors are concrete. The style of architecture is a free adaptation of the Italian Renaissance. The main approach will be on Noe street, where there will be a handsome gatekeepers' lodge corresponding in style with the building. The power house, with a brick chimney 100 feet in hight, will be located in the rear of the administration building. The south wing, which will be used as the main hospital for some time, is divided up into a number of separate wards for various classes of patients, the general operating rooms being on the top floor and baths of all descriptions in the basement. An elaborate ventilating system will be installed. Fresh air is forced into the building, purified and warmed and supplied to each apartment at the desired temperature. The vitiated air is drawn out by electric fans. The Wilson-Lyon Construction Company has the general contract for the work.

Meeting of National Association of Cement Users.

The coming convention of the National Association of Cement Users will be held in the Armory Building, Milwaukee, Wis., January 9 to 12. The association was organized at Indianapolis in January last and the fact that a field existed for it was demonstrated by the attendance of over 600 users of Portland cement from all parts of the United States. Numerous interesting papers relating to concrete block construction will be presented and discussed and the meeting is expected to result in great benefit to the trade. A considerable amount of concrete construction has been carried on in Milwaukee, and this will afford an excellent opportunity for those in attendance at the convention to inspect actual work.

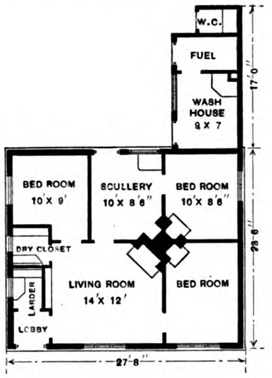
◆

THE addition about to be made to the Hoffman House at the corner of Broadway and Twenty-fourth street, New York City, will be 12 stories in hight, and will have a frontage of a trifle over 49 feet on Broadway, with a wing in Twenty-fourth street having a frontage of a trifle over 47 feet. The exterior will be of granite and limestone, with stone cornice, terra cotta flat arch floors, copper skylights, &c. The plans have been drawn by Architect R. L. Davis of No. 130 Fulton street. In order to erect the addition to this well-known hostelry it will be necessary to demolish three old buildings.

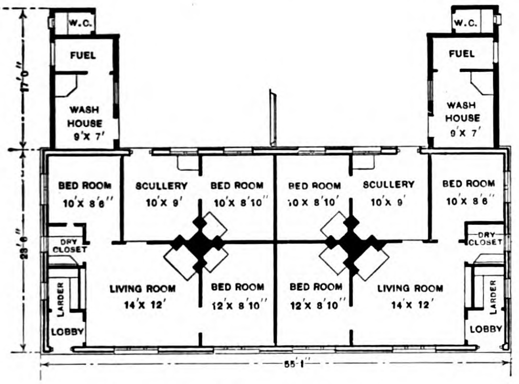
Some Cheap English Cottages.

Early last fall there was an exhibition of cheap cottages at Letchworth, England, which attracted a great deal of attention, not only of the architectural profession, but also of all interested in providing comfortable dwellings at a low cost suitable for the working classes. A number of prizes were offered for the four classes of cottages which were exhibited. Class 1 included cottages to cost not more than £150, or approximately in American money $750. The prizes for Class 2 were for the best pair of 5 room cottages including scullery or kitchen scullery, erected at a cost of not to exceed £300 ($1500. Class 3 embraced groups of three or four cottages, no one cottage to contain more than six rooms including scullery, and erected at a cost not to exceed £35 per room. Class 4 embraced detached cottages or pairs of cottages, each containing not more than 6 rooms including scullery, and erected at a cost not to exceed £35 per room.

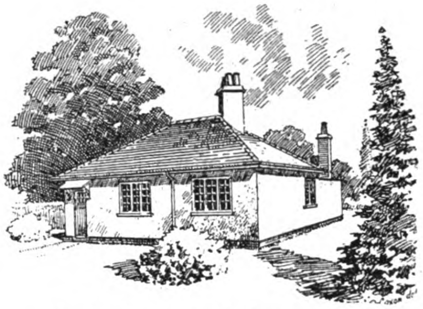
Floor Plan of Double Cottage.



Plan of Single Cottage.



Floor Plan of Double Cottage.



Perspective of a Single Cottage.

Some Cheap English Cottages.

In order to give American readers an idea of the arrangement embodied in some of these designs for which prizes were awarded, we take pleasure in presenting herewith the plan and perspective of the pair of cottages awarded the first prize in Class 2; also the third prize design for a single cottage. The walls of the main buildings in the first prize cottages are of concrete reinforced with steel rods, to which steel lathing bars and metal lathing are fixed on both sides. Externally the plastering is granite rough cast and internally the ordinary kind of plaster. The inside partitions are concrete, 3 inches thick. The floors are concrete, 5 inches thick, resting on 5 inches of dry core. The living room and bedroom floors are of one inch material nailed direct to the concrete. The prizes in both cases illustrated were secured by Potter & Co., 66 Victoria street, Westminster.

◆

WHAT is said to be the largest pile driving contract ever awarded in connection with the foundation work of any building in the city of New Orleans, La., is now being carried out as a part of the work connected with the addition to the Grunewald Hotel, in that place. There will be 2000 piles sunk, each being of yellow pine 60 feet in length. The sheet piles driven around the walls are 8-inch pieces, about 5 inches thick. It is stated that it will take five or six weeks to complete the pile driving work, which is being done by Charles A. Sicard of New Orleans, whose contract also covers the work of excavating for the cellar of the new building. The area of the building site is about 130 x 160 feet, and it is required to bring the cellar level to a point 15 feet below the street grade line. About 12 feet of excavating will have to be done for the cellar, and then the piles will be cut off at the proper level, which will leave about 48 feet of their length imbedded in the earth.

◆

Roofs of Old Houses in France.

One of the marked features of some of the picturesque old houses to be found scattered through the provinces of France is their high pitched roofs. One forgets, says Barr Ferree, in a late number of the *House Beautiful*, that these projecting eaves, these high pitched roofs, are simple mechanical devices to throw off the water and protect the walls below. Surely such happy inclines, such grouped pyramids, such admirably placed dormers, were not drawn out on a drawing board and the timbers set from carefully prepared designs. Nor, indeed, are they mere chance erections, put up haphazard and without thought of effect or result. Nor do they hint at experiments in building. These fine old houses show very clearly that they were put up by workmen long accustomed to build just such houses, and no others. At the time they were built, probably in the fifteenth and sixteenth centuries—building methods had apparently become localized. The great cathedrals, as is well known, were large-

ly built by bands of workmen traveling from city to city and from province to province. The wide distribution of houses built along similar lines, and the fact that they are frequently of small size, showing that no especial skill was employed in their erection, point to a marked localization of the building industry at the close of the mediæval period.

We have no reason to suppose that skilled workmen were employed in the small old house to any greater extent than such laborers would be employed in buildings of corresponding importance to-day. But there is this important difference to be noticed between the old houses and the modern ones. The old houseowners and housebuilders could command the services of skilled art workers who carved the beam ends, decorated the capitals of the columns, cut out the bands of ornament. We have no art laborors to-day who can do similar work or who fill the same part in the life of the time. It is from such a source that the old houses obtained the note of individuality that is as distinctive to-day as when the wood was freshly cut. It is no wonder they are picturesque, when artistic craftsmen could be called in for such simple yet effective decoration.

New Publications.

The Sanitation of a Country House. By Dr. Harvey B. Bashore. Size, 4¾ x 7¼ inches; 102 pages; 16 full-page half-tone illustrations. Published by John Wiley & Sons. Price, $1.

The most interesting features of Dr. Bashore's book may be summarized as follows: The explanation of the importance of studying both the soil of the site for a house and the relation of the site to the surrounding country; its reference to room arrangement in respect to sunlight and exposures; the care that must be exercised in selecting the water supply; several suggestions for the sanitary disposal of the wastes; useful hints on the needs for cleanliness and orderliness in the surroundings of the house; valuable directions concerning the sanitary equipment of a summer camp. The little book is written in an unusually entertaining fashion, and while it is, perhaps, primarily intended as a guide to the intelligent house owner planning the erection of an isolated building, it is none the less of value to the plumber having a chance to practice country sanitary engineering. Its information concerning waste disposal will interest the latter particularly, owing to the fact that specific data are given from which similar work may be planned. In view of the belief we have that the septic tank is to have no small place in the disposal of household wastes in the future, we regret that the author did not give some space to this method of sewage purification. With respect to his chapter on water supply, many readers will doubtless be surprised to learn how chary one must be to place dependence on the babbling brook as a source for pure water, for the headwaters of this same brook may meander through tilled fields and over filthy highways. The extension of pollution to springs is emphasized when he says that out of a series of 52 wayside springs examined several years ago only 16 yielded unpolluted water. While most of the remaining 36 yielded water which was not dangerously polluted, the figures illustrate the necessity for using care in the determining on the water supply. Dr. Bashore is inspector for the State Board of Health of Pennsylvania.

The Carpenters' Guide. Compiled by Abram F. Baker. Size, 4½ x 5¾ inches; 178 pages. Published by the author. Price in board covers, $1.25, postpaid, or in leatherette, 75 cents.

This work is in effect a glossary of terms used in architecture, carpentry and building, and at the same time shows their practical application. The matter is presented in concise form so as to be easily understood, and will be found of special value to the carpenter who desires to be posted as to the names and uses of the tools and materials used in building. There are 1255 paragraphs arranged alphabetically, thus making the book one of ready reference and a convenient addition to the builder's library of trade literature.

The Competent Life. By Thomas D. West; 268 pages. Size, 5 x 8 inches; numerous illustrations. Bound in board covers. Published by the Cleveland Printing & Publishing Company. Price, postpaid, $1.25.

While the author of this work is well known as a writer on metallurgical subjects the present effort constitutes a treatise on the judicious development, direction and employment of man's inherited ability to aid in the betterment of labor. The essays are the fruit of much experience and thought concerning the vital question of efficiency, its necessity and methods of attainment, and "is presented with the light and intelligence which two-score years of active service can give." The author says that he "has no motive in presenting this work other than a sincere desire to influence for good the lives of all classes of workers." Drawing on his experience as an employer of labor he points out the reasons for the incompentency and ill success of so many workers in all lines. He considers incompetency to be a matter of very serious concern in connection with the industrial development of the United States. In stating that the nations most advanced in the use of machinery are to-day most in need of strong, intelligent laborers and efficient skilled workers, the author adds that clerical positions are overcrowded by persons who will not acquire skill in trades, with the result that "we are drifting entirely too much to the easy and clean collar and cuffs situations, and developing entirely too many seekers of leisure rather than of labor."

One of the plans advocated by Mr. West to make easier the acquisition of trades by young men is the establishment of institutions which will loan money on collateral or the security of bondsmen to aid in the support of those who are serving apprenticeships. Such a loan, he considers, need not exceed in the majority of cases $250. Another plan advocated is the establishment of public information and employment bureaus through which those out of employment could learn of employers who need labor. This last suggestion, it might be added, is now taking form in England in a proposition for legislation to reduce the number of unemployed. The author discusses the causes and extent of poverty and pauperism with strong emphasis on the baneful effects of the drink habit in the deterioration of workers physically and morally. The twenty-seventh and concluding chapter of the book is devoted to the benefits of cheap commodities secured not by cheap wages but by the highest efficiency of labor. A number of examples are cited of the increase in the cost of necessities through restrictions which require three men to do what two men should do. Labor's worst enemy in the opinion of the author is the spirit which holds back, has no regard for the employer's interest and checks the effort of ambitious, energetic operatives who would make good wages by increasing their productive ability.

◆

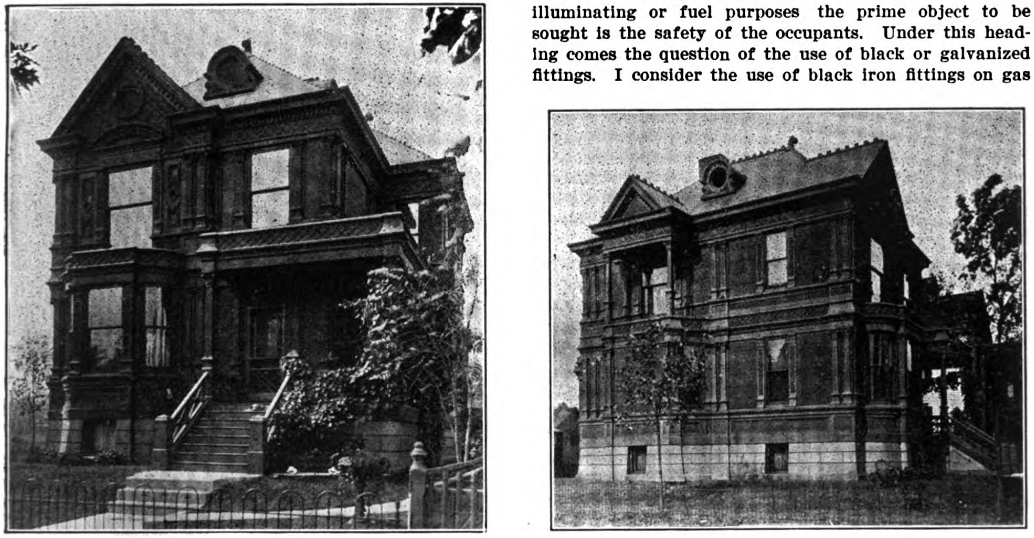
A COOLING AND VENTILATING PLANT in a cottage 18 x 38 feet in size, of the old English style, was shown in the Manufacturers' Building at the Lewis and Clark Exposition by the W. G. McPherson Company, engineer, Portland, Ore. The system consists in drawing air by means of a suction fan from the exterior of the building through water cooled coils inclosed in a sheet steel casing and discharging it through ducts leading to openings in the building placed about 8 feet above the floor. The temperature is controlled by an application of the Johnson system of temperature regulation. It is understood that the temperature can be cooled from 95 to 65 degrees F. with ease. The apparatus comprises an electrically driven fan, capable of delivering 1200 cubic feet of air per minute into the building, and the mechanism occupies 10 x 18 feet of space in the exhibit.

AMONG the notable building improvements in the Borough of Brooklyn, N. Y., is a ten-story high class apartment house at the corner of Pierrepont and Henry streets which will cover a plot 52 x 132 feet and cost several hundred thousand dollars. There will be two suites to the floor, each consisting of 14 rooms and three bathrooms.

A Sheet Metal Covered Dwelling.

A most interesting example illustrative of the use of sheet metal in the external treatment of a dwelling house is shown by means of the two half-tone engravings presented herewith, one representing a front view of the house and the other a side view. The frame of the building is of the usual balloon style, covered with ship-lap sheathing ⅞ inch thick. Over this was placed building paper, on which was laid the galvanized steel plates of 26 gauge, embellished with stamped zinc ornamentation. Even the newel posts and rails to the front steps are of the galvanized material, and in fact it covers the entire building except the roof, which is of slate.

The house contains 12 rooms and is two stories and basement in hight. It is heated by hot air and fitted with Symonds registers. It is located at the corner of Summit avenue and Ninth street, East St. Louis, Ill., and was built 14 years ago for H. Symonds of the Symonds Mfg. Company. The exterior is painted to represent ordinary sandstone and although erected so long ago is at the present time in an excellent state of preservation.



Front View. Left Side Elevation.

A Sheet Metal Covered Dwelling.

Gas Piping in Houses.

An interesting paper on the subject of house piping for gas distribution was read at the meeting of the Pacific Coast Gas Association in July, in San Francisco, by George Kirk, of Oakland, Cal. His views are based on an experience of thirty years as inspector for the Oakland Gas Light & Heat Company. While he is inclined to censure harshly the methods of gas fitters, nevertheless his observations on the general subject are of sufficient value to warrant the following abstract of his contribution. He has found that much small pipe rather than large pipe gets into work, if it can be covered before an inspector sees it, and in some cases he has known pipe to be filled with sal ammoniac water, muriatic acid and the like to induce rust in the hope of stopping leaks and keeping the pipe tight long enough so that the job may pass inspection. He does not hesitate to say that pipes at best rust soon enough without any special aid. The rest of his paper is substantially as follows:

On account of the stoppages in pipes, caused by rust and condensations, some years ago the Oakland Company changed the rules governing the size of pipe, increasing same very materially from the size then in use, and since then has had little or no trouble. Three-eighth inch pipe is used only for brackets or side lights. No horizontal pipe less than ½ inch and house riser less than ¾ inch. I find that if pipe less than the size specified in our rules is used we are liable to have more or less trouble with stoppages in the same, caused by the following reasons:

The majority of gas fitters use the three wheel cutter to cut the pipe, which leaves a burr inside at each end and diminishes the size of the pipe. The gas fitter then in using lead or cement in his fittings places the same inside of the coupling or fitting and not on the threads, as should be done. The result of this is that more or less of the material is forced inside and against this burr, leaving a very small opening in the pipe. Although this is the time of high pressure and small pipes for street mains, I cannot see where we can lessen the size of house piping with any assurance of satisfaction to the consumer. However, it will always be necessary to use a governor and low pressure on the house pipes, as very few if any gas fixtures would stand one pound pressure.

In considering the placing of house pipe for either illuminating or fuel purposes the prime object to be sought is the safety of the occupants. Under this heading comes the question of the use of black or galvanized fittings. I consider the use of black iron fittings on gas pipes concealed within the walls or under the floors of a building a constant menace to the general public, as black iron fittings are known to have more or less sand holes in them, and sometimes very large ones at that. When the plumber finds a fitting with one of these large sand holes in it he is not going to cut it out, for it will probably cost him a couple of dollars to do so. The result is that he resorts to the use of gas fitters' cement to plaster it up, this being the easiest and cheapest way out of it for him. The inspector will not be able to see same for the simple reason that the plumber knows how to cover it up. From my experience I am sure there should be a rigid rule against using gas fitters' cement under any circumstances on concealed pipes. In a few years the action of the chemicals in the gas will soften that cement, and there is a leak under the floor or in the wall. It is for this reason that I advocate the use of galvanized fittings exclusively for house gas pipe.

I also suggest, from the standpoint of safety, that there should be a shut off in the main pipe on the first floor and it be marked as the gas stopcock. This, I think, would be the means of averting a great many accidents with gas. Such an occurrence happened in Oakland a few days ago, when a man got up about 6 o'clock in the morning, and going into the hall found the place full of gas. He naturally tried the gas fixtures to see if any were loose, probably not knowing where to shut off the gas. The broken fixture was found, and it was remembered that in carrying out a trunk the night previous this fixture had been struck by the trunk, causing a bad leak near the wall. The fixture was a com-

bination gas and electric, and when the gentleman endeavored to move the fixture the electric wire emitted a spark that exploded the gas which had accumulated during the night. Now, I believe that if there had been a stopcock on the main pipe, easy of access, and known to him, this accident would not have occurred.

In the discussion which followed the reading of the paper it was brought out that carpenters often times drive nails through the piping. It was also the opinion of several that troubles through leakage occurred not so often through defectively installed piping but through poorly constructed gas fixtures. It was explained that the pipes are usually tested with the caps on and that when one talks about cement being used, that there is more cement used in one fixture than a plumber will use in a whole house. In one case it was reported that nine leaks out of every ten were due to poor fixture work.

An interesting experience with galvanized fittings was also described. It was the case of a 1¼ inch galvanized pipe in the State Capitol at Sacramento. A length of pipe ran horizontally underneath a floor and it was always stopping up. When it was taken out it was found to contain a dust or powder that was very fine, amounting to about a hatful. A year or so afterward the trouble again arose with the same length of piping, and as a result a length of black pipe was put in and no trouble has since occurred. At that time, it was explained, coal gas was used in Sacramento, but the general opinion seemed to be that it was not the result of the galvanized pipe being attacked by gas of any kind but a case of poor galvanizing; perhaps a case where the scale had not been shaken out of the pipe; in other words, that the length of pipe had not been hammered and put on end to remove the scales.

Water Proofing Brick Arches.

The subject of water proofing of masonry is one of special interest just at this time, and the following particulars relative to the method of water proofing the brick arches of the masonry viaduct of the Pennsylvania Railroad in Wilmington, Del., may prove of suggestive value: The water proofing is accomplished by first smoothing the masonry over with cement mortar, which in turn is covered with a special compound on which is placed a layer of Hydrex felt so as to lap at least 12 inches on the transverse seams; five layers of compound and five of felt are used. In securing tightness around the drain pipes and at the spandrel walls the felt is carried up the back of the latter and turned into the joint under the coping about 2 inches, where it is held with cement mortar. The water proofing on the arches is protected with 1 inch of cement mortar and that on the walls with a single course of brick work.

Brooklyn Master Sheet Metal Workers Organize.

In response to a call issued by William Martin and Trustee C. W. Smith of the National Association of Master Sheet Metal Workers, a meeting of master sheet metal workers of Brooklyn was held at the Lexington House, 854 Gates avenue, Brooklyn, on Friday evening, November 24, which resulted in the formation of the Association of Master Sheet Metal Workers of Brooklyn, N. Y. The following officers were elected:

President, O. H. A. Milhan, 61 Lafayette avenue.
Vice-President, C. W. Smith, 307 Sumner avenue.
Secretary, J. B. Cooney, 645 De Kalb avenue.
Treasurer, William Buchanan, 1587 Fulton street.
Sergeant-at-Arms, Thomas F. Black, 682 Fulton street.

◆

To the casual visitor it would appear that the Metropolis was already well supplied with theaters and other places of amusement, but the growing population requires a constant addition to the number and the neighborhood of Forty-second street and Broadway appears to be the center for playhouses of this kind. The latest addition to the colony is to be located near the Lyric, fronting some 40 feet on Forty-second street and running through to Forty-third street, where it will have a frontage of 100 feet. The structure will be three or four stories in hight and cost about $800,000, including the site. The plans are drawn by Alexander I. Finkle of Williamsbridge, Borough of the Bronx, and call for a seating capacity of about 1900 people. Another theater building, to cost about $200,000, will soon be erected at the northeast corner of Broadway and Thirty-ninth street, immediately opposite the Metropolitan Opera House, and will be known as the "Sarah Bernhardt." Both these playhouses will be managed by L. & S. S. Shubert of 213 West Forty-second street.

A NEW wing is about to be added to the Metropolitan Museum of Art in Central Park, New York City, opposite East Eighty-second street. The building will constitute the north wing and will be constructed of limestone, like the existing front. It will be 345 feet long, 120 feet deep and will be finished within a period of three years at a total cost of $1,500,000. Later a south wing of the same dimensions and style of architecture will be constructed, which is estimated to cost an equal sum. The ground floor of the north wing will be devoted to exhibitions of sculpture and other collections of a heavy nature, while the second floor will be used for the picture galleries.

CONTENTS.

ABSOLUTELY UNPARALLELED

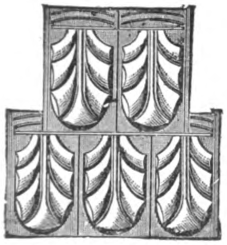
AUTOMATIC MITRE CLAMP

Try a sample! We say it is the simplest, most unique and thoroughly efficient, low-priced clamp on the market.

Sets in place and clamps a mitre in less time than it takes to make a full turn of a single screw.

Ask for Descriptive Circular No. 1858.

HAMMACHER, SCHLEMMER & CO.,
HARDWARE, TOOLS and SUPPLIES.
NEW YORK SINCE 1848.
4th AVE. & 13th ST. (BLOCK SOUTH OF UNION SQUARE.)



NEW CENTURY

PAINTED TIN
GALVANIZED
COPPER : : : :

Churches and School Houses
ARE BEING COVERED EXTENSIVELY WITH OUR

NEW CENTURY PATENT METAL SHINGLE

WHY?

See next issue of this paper. Correspondence Solicited.

MANUFACTURED SOLELY BY

The Chattanooga Roofing & Foundry Co.,
CHATTANOOGA, TENN., U. S. A.

Carpentry and Building
WITH WHICH IS INCORPORATED
The Builders' Exchange
PUBLISHED MONTHLY

To all parts United States, British America and Mexico, - -	$1.00 Per Year
To all other Countries, - - - - - - - - - -	1.25 Per Year

Advertising Rates on Application.

BUSINESS OFFICES.

NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHERS........14-16 Park Place.
PHILADELPHIA—S. S. RECKEFUS, Manager..Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—WALTER C. ENGLISH, Manager........Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, Manager........Park Building, 357 Fifth Avenue.
CHICAGO—A. A. AINSWORTH, Manager........Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—HENRY SMITH, Manager........Pickering Building, Fifth and Main Streets.
CLEVELAND—EZRA S. ADAMS, Manager........The Cuyahoga, 311 Superior Street.
LONDON OFFICE........Hastings House, Norfolk Street, Strand.
AUSTRALIAN OFFICES........MELBOURNE, 231 Elizabeth Street.
SYDNEY, Palings Buildings.

ENTERED AT THE POST OFFICE, NEW YORK AS SECOND-CLASS MATTER.

HOUSE HINTS FOR THOSE WHO BUY, BUILD OR RENT A HOME.

A pamphlet of intelligent suggestion which even the professional builder will do well to consider.

Recites vital points concerning advantages defects and shortcomings in location, site, environments, appointments, construction, foundations, cellars, walks, roofs, stairs, halls, doors, plastering, painting, plumbing, lighting, heating, papering, etc.

25 cents, postpaid.

DAVID WILLIAMS COMPANY
14-16 Park Place, New York.

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

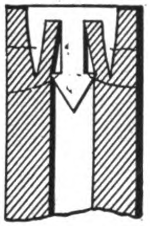
Digitized by Google

Original from
UNIVERSITY OF MICHIGAN

NOVELTIES.

Neverslip Anchor Wedge.

Building mechanics as well as all others having occasion to make use of hatchets, hammers axes or other tools of similar nature, will be interested in the Neverslip Anchor Wedge, a device intended to securely anchor the head of the tool to the handle by which it is wielded. The sectional view, Fig. 1, shows the operation of the wedge, clearly indicating that when it is driven into the handle the wood is forced up over the shoulder of the shank, thus adding permanency, while at the same time securely anchoring the handle to the hammer, axe or other handled tool. The outside spurs engage the wood and bend it into the shoulders of the shank of the wedge, all as clearly indicated in the engraving. The appearance of a hammer fitted with this anchor wedge is indicated in Fig. 2. The wedge consists of a single piece, but accomplishes, it is claimed, all that any wedge can, and in addition it anchors automatically. It secures its anchorage at its greatest wedging power and by so doing closes the pores of the wood, making it practically impervious to moisture. It is simple in construction, easy of application, and the importance of the dovetail in its permanency cannot fail to be recognized by carpenters generally. The wedge is made in three sizes, one being intended for hammers, another for hatchets and the third for axes. The device is being introduced to the trade by the Neverslip Anchor Wedge Company, Auburn, N. Y.



Novelties.—The Neverslip Anchor Wedge. —Fig. 1.—Sectional View.

Thompson's Ventilating Skylight.

An automatic ventilating system which is applicable to skylights, fire windows, cellar doors, manhole covers, sidewalk lights, &c., is being introduced to the attention of the trade by the H. E. Thompson Mfg. Company, Board of Trade Building, Louisville, Ky. It is the invention of H. E. Thompson of the company named, and the device consists of a movable cap with stationary bottom. It is operated by means of lever, spring motor, electricity and weights, or by hand, as may be most convenient. The object of the invention is to exclude the elements, while permitting light to pass through and at the same time afford a ready means of ventilation. It is also designed to automatically open or close all ventilators throughout a building, to accurately locate undue rise of temperature in the building, register its number, as well as that of the floor, apartment, room and the degree of heat contained therein. The arrangement is also such that the device can be regulated to any degree of heat desired. The ventilating apparatus is constructed of copper or galvanized iron in different finishes, is claimed to perfectly regulate the intake, eliminate drafts and exclude dust. It is adapted either to a single room or to a whole building and is said to be easily installed in new or old structures.

The Ransome Floor Surfacing Machine.

In connection with the articles on "The Laying and Finishing of Hardwood Floors," now running in the reading columns of the paper, it may not be without interest to describe a machine which has recently been placed upon the market designed for surfacing all kinds of floors. It is known as the Ransome Floor Surfacer and consists of a steel framework mounted on ball bearing casters and supporting an electric motor of 1½ horse-power that drives a revolving disk. A general idea of the arrangement and construction of the device may readily be obtained from a careful inspection of Fig. 3. The disk referred to may be of emery or carborundum or it can be covered with sandpaper where it is desired to surface a hardwood floor. If, however, the work is that of surfacing concrete, marble or stone, a wire brush may be substituted for the emery disk. Surrounding this disk is a hood, shown partially removed in the picture, from which a pipe leads to a bag that receives the dust, a small suction fan belted to the motor serving to suck up the dust from the hood. The motor, it will be observed, is mounted on an upright gallows frame which swings upon a hinged joint at its lower end, while a pair of coiled springs serve to counterbalance the weight of the projecting arm carrying the revolving disk. When the machine is not in operation these springs raise the projecting arm, thus lifting the disk from contact with the floor. By means of a handle, however, the disk can be pressed down upon the floor with as little or as much force as the circumstances of the case may require. Moreover, the operator can swing the projecting arm right or left, according to necessity, thus enabling him to work around projections, while the whole machine can be moved from place to place as readily as a carpet sweeper. A floor can be brought to a high polish in applying wax by covering the revolving disk with cloth. In the absence of a street current from which to secure electricity a small electric generator driven by a gasoline engine is utilized to run the machine. The device is being introduced to the attention of the trade by the Ransome Concrete Machinery Company, 11 Broadway, New York City, and in referring to the machine the statement is made that it was used to finish eight acres of hardwood floor in the Potter Hotel, at Santa Barbara, Cal.; also 6000 square feet of floor in Hotel Green, at Pasadena, as well as the floors in scores of residences and public buildings. Builders and contractors cannot fail to be interested in this labor saving device, as it can be operated to great advantage where large floor areas are to be surfaced.

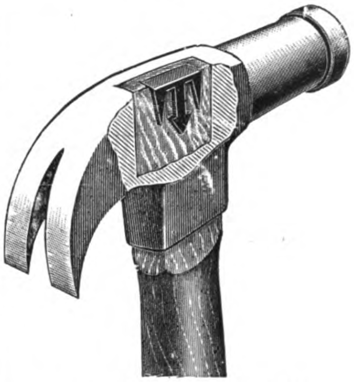


Fig. 2.—Wedge Applied to a Hammer.

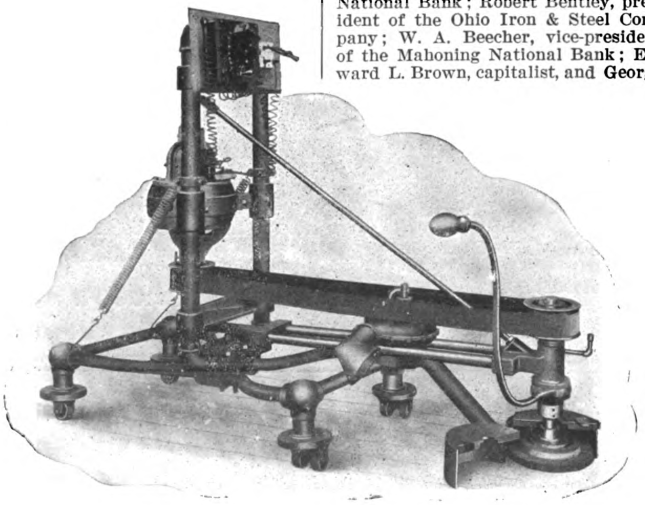


Fig. 3.—General View of the Ransome Floor Surfacing Machine.

The Reliance Edge Tool Company.

This concern was organized at Youngstown, Ohio, on November 15, the following directors being elected: John C. Wick, president of the Wick National Bank; Robert Bentley, president of the Ohio Iron & Steel Company; W. A. Beecher, vice-president of the Mahoning National Bank; Edward L. Brown, capitalist, and George E. Dudley, all of Youngstown, Ohio. The directors organized by electing Edward L. Brown president, Walter A. Beecher vice-president and George E. Dudley secretary and treasurer. Charles H. McCarty, until recently treasurer of the Winsted Edge Tool Works, manufacturer of the "T. H. Witherby" brand of chisels, has been elected general manager of the Reliance Edge Tool Company. Mr. Mc-

Carty has had a very thorough and successful experience in the manufacture of edge tools, which assures a high quality of the tools to be made by the new concern, whose product will be known to the trade as the "Reliance," and at first will consist of carpenters' tools, such as chisels, gouges and drawing knives. The concern has let a contract to Heller Brothers of Youngstown for the erection of a main brick building, 325 feet in length, a large portion of which will be two stories in hight. The concern expects to be in the market with its products very shortly after January 1.

Novelties.—Fig. 4.—The Standard Concrete Mixer.

The Phœnix Fire Proof Frame and Sash.

Since perfecting the construction of the Phœnix fire proof frame and sash the S. Keighley Metal Ceiling & Mfg. Company, 819 to 823 Locust street, Pittsburgh, Pa., has been unable to keep up with the demand for it, and the makers are now seriously contemplating some extensive improvements in order to provide adequate facilities for the constantly growing business. In this connection it may not be out of place to state that among the large contracts the company has on hand is the new 13-story office building of the Baltimore & Ohio Railroad Company in Baltimore, calling for frames and sash made of 20-ounce copper and glazed with polished plate wire glass. The company also has the contract for the metal frames and sash in a 10-story building for the Bell Telephone Company, the frames and sash in a 12-story building for the Hartje Paper Company, both in Pittsburgh, Pa., as well as several other large contracts in different parts of the country, notably in Buffalo and Rochester. In order to adequately cover various sections the company has branch offices located at 15 and 17 West German street, Baltimore, Md.; 1335 F street, N. W., Washington, D. C., and 560 Wythe avenue, Brooklyn, N. Y.

Johnson's Prepared Wax.

An interesting pamphlet of 32 pages bearing the title "The Proper Treatment for Floors, Wood Work and Furniture" is being sent out with the compliments of S. C. Johnson & Son, Racine, Wis. The little work is beautifully illustrated by means of half-tone reproductions from photographs showing some of the methods of applying Johnson's specialties, while the text gives complete yet simple directions for beautifying the home. The matter was written by one who is said to have had over 23 years' practical experience in finishing wood. The introductory pages are devoted to some suggestions as to the selection of woods, after which the treatment of wood is considered, including new floors, wood work, furniture, dancing floors, old floors, &c.; the removing of old finish, the artistic coloring of woods, and how to keep wood work in condition. The concluding pages illustrate and describe accessories required for the purpose named, the quantities necessary to cover a certain number of square feet of surface, prices of Johnson's prepared wax and wood dyes, fillers, &c., and an index arranged according to pages rather than alphabetically.

Standard Concrete Mixer.

The extent to which concrete in various forms is being used at the present day in connection with building construction lends additional interest to the devices which are at present on the market for mixing the ingredients. One of the latest candidates to public favor in this line is the Standard Concrete Mixer, which we illustrate in Fig. 4 of the engravings. The picture so clearly indicates the construction employed that comparatively little description would seem to be necessary. The various parts are so simple that the mixer cannot readily get out of order, and it has a capacity for handling ¼ yard at a time. The machine is self-cleaning, is filled and unloaded easily and is especially adapted for brick or block work. The device is made for both hand and steam power, the illustration showing its appearance when operated by the former means. It is made by the South Bend Machine Mfg. Company, with office and factory at 1702 South Franklin street, South Bend, Ind.

The "Wonder" Sanding Machine.

Several new features have recently been embodied in what is known as the Wonder Sanding Machine, brought out by C. H. Driver, 1317 Sixteenth street, Racine, Wis., and brief reference to them may not be without interest in this connection. Among these features may be mentioned the spindle attachment for sandpapering scroll work, the claim being made that with it holes as small as ⅜ inch can be sandpapered. Another important feature is the table being provided with a protractor which can be set for sandpapering work on a square or miter. The table is also graduated so that it can be set without the use of a square or bevel. The claim is made that flat surfaces, as well as the inside and outside of circular work and scroll work, can be sandpapered ready for piano finish without further labor, and that all these operations can be done with but one handling if such a course be necessary. Referring to the general view shown in Fig. 5 of the illustrations, 1 is a cork roll which drives the sandpaper belt; 2 is the sandpaper belt, with a portion of it torn away so as to show the working parts of the sander; 3 is the surface plate, over which flat work and the outside of curved work are sandpapered; 4 is an adjustable roll for giving the proper tension to the sandpaper belt, while 5 is a removable guide plate in front of the cork roll, so that the plate over which the sanding is done can be approached without danger of touching the roller and making machine marks. For sandpapering the inside of curved work this plate is removed as the work is done over the cork roll. The machine here shown was designed by a practical, all-around wood worker, a manager and a proprietor of a factory whose specialty was strictly high grade work. The upper part of the illustration shows the shelf and the

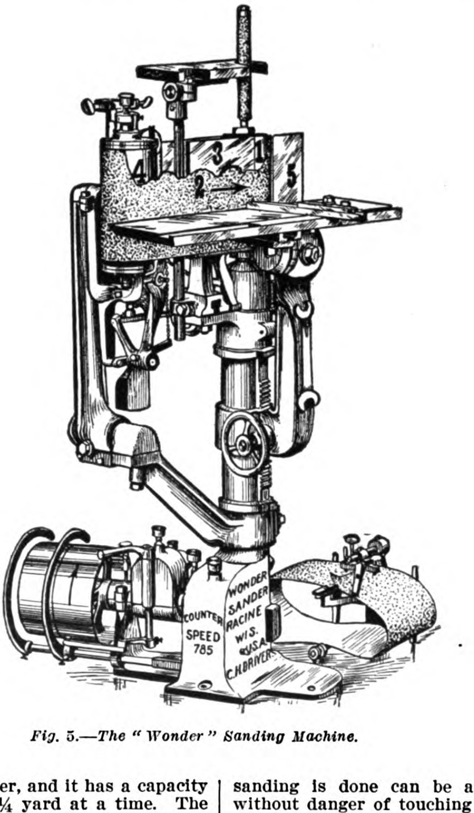


Fig. 5.—The "Wonder" Sanding Machine.

spindle of the attachment for sand-papering scroll work.

Favorite Sand Cement Brick Machine.

The Cement Machinery Company, Jackson, Mich., has just placed upon the market a new sand cement brick machine known as the Favorite, which is the invention of L. P. Normandin, the well-known inventor of the Normandin Concrete Building Block Machine. The brick machine represents the results of a long series of experiments, and the model now being introduced to the trade is offered in two sizes, one making 20 brick at a time and illustrated in Fig. 6 of the engravings and the other known as No. 2, which makes 10 brick at a time. Both sizes are equipped with different plates for rock, plain and tool face brick. The machine is operated by hand and the manufacturer claims that it is the fastest, simplest and best machine of the kind now before the public.


Novelties.—Fig. 6.—The Favorite Sand Cement Brick Machine.

Catalogue of Wood Working Machinery.

One of the handsomest catalogues devoted to wood working machinery which it has recently been our privilege to examine is the 320-page publication which reaches us from the American Wood Working Machinery Company, with executive offices at 136 Liberty street, New York City, and with salesrooms in Chicago and New Orleans. The volume measures 9 x 12 inches in size, is printed upon a fine quality of calendered paper and is substantially bound in heavy board covers, with neat side and back titles, consisting simply of the name of the company. The engravings illustrating the various lines of machinery manufactured clearly show the important features of construction, many of the latter being presented in detail. The size of the volume is such as to permit of the use in many instances of several cuts to a page, while in other cases one cut of liberal proportions is used. The goods illustrated and described in this general catalogue cover a wide range, embracing practically everything required by the wood worker, whether operating a large or a small plant. In fact, the machines are of such a widely diversified character as to be adapted for general use in planing mills, sash, door and blind factories, box making establishments, furniture and cabinet factories, car and pattern shops and agricultural implement works. The company also makes various special and miscellaneous machines not illustrated in the catalogue, but photographs and particulars of which can be had on application. In connection with each machine is a detailed description calling attention to its essential features, stating the sizes and styles in which it is offered, the floor space it occupies, the horse-power required to operate it, the weight in pounds and also when boxed for export, together with the code words. The company makes the statement that in order to produce its machines more economically it has enlarged its several factories and re-equipped them with the latest tools and appliances, thus permitting not only a greatly increased product but the production of more nearly perfect machines. The opening pages are devoted to an extensive telegraphic code, which will be found useful in ordering by wire, while at the close of the volume is an index of the machines alphabetically arranged. The volume, considered as a whole, is a highly creditable example of the printer's art and will be found a valuable addition to the wood worker's library of trade literature.

The Maydole Hammers.

We have received from the David Maydole Hammer Company, Norwich, Chenango County, N. Y., a copy of an attractively printed catalogue of 48 pages relating to the Maydole hammers, which are press forged from solid crucible cast steel. Since the issue of the last edition of the company's catalogue the manufacturing facilities in all departments have been greatly increased and many new numbers have been added to the variety of hammers listed at that time. The regular line of Maydole hammers now comprises 343 styles, sizes and finishes. Among these new goods may be mentioned Adz Eye nail hammers in several varieties, joiners' nail hammers, brad hammers, Farriers' Adz Eye driving hammers with whaleback claw and octagon neck, machinists' ball pein hammers, cornice, roofing and tile setters' hammers. The goods are illustrated by means of colored engravings, which give an idea of the exact appearance of the finished articles. In connection with the illustrations are given the numbers in which hammers are made, their weight and the prices per dozen. The weights given, however, do not include the weight of the handle. Accompanying the catalogue is a little pamphlet of a size convenient to carry in the pocket, entitled "A Captain of Industry," and consists of the story of David Maydole, inventor of the Adz Eye hammer. To this is added a catalogue of the principal varieties of hammers now made by the company in question, together with much useful information for mechanics and others. A feature which will be appreciated is an index, both alphabetical and numerical, of the hammers in question.

Wolff's Enameled Lavatory Catalogue.

Modern plumbing fixtures with all their conveniences are of great interest to architects and builders and the salient features can readily be understood by means of the excellent catalogues which different manufacturers are now preparing for the trade. The L. Wolff Mfg. Company, Chicago, Ill., with manufacturing plants in Chicago and Trenton, N. J., and warehouses in these cities and Denver, has just issued a 158-page catalogue, 4½ x 7½ inches in size, and profusely illustrated with half tone engravings, devoted entirely to their handsome and extensive line of lavatories and lavatory fittings. A special page in the catalogue bears the trademark in color and states that plumbing goods of every description are made in brass, iron, copper, wood, solid porcelain, vitreous porcelain, vitreous china, German silver, enameled iron and metals. The catalogue opens with handsome new patterns of oval enameled iron lavatories supported by pedestals in different styles and some supported by brackets. Handsome one-piece enameled iron lavatories with the Kenmore Ideal bowl and ornamental apron, and having a high back are shown resting on pedestals and also supported by means of brackets, some of which are concealed. The line is extensive and the beautiful designs are adapted alike for the luxurious residence and the comfortable cottage. Specially constructed lavatories with pedal opening faucets for hospitals and sanitariums are illustrated and lavatories with shower bath attachment for home or barber shop use. An extensive variety of lavatories and sectional wash sinks for setting in a battery for hotel or factory buildings are shown. The last portion of the catalogue is devoted to a variety of styles of basin cocks of the Fuller, compression and self closing patterns, brackets, nickel plated lavatory legs, brass traps, towel rods, towel holders and bath-room specialties. The catalogue is one that will be of more than ordinary interest to the contracting plumber owing to the excellent manner in which the lavatory for all purposes is presented.

The Hubbard Window Sash Lock.

A device in which architects, builders and house owners generally are likely to be interested is the latest improved form of the Hubbard Window Sash Lock, which we illustrate in Fig. 7 of the engravings. It is referred to as simple and durable in construction, easily adjustable and as being adapted to buildings of all kinds. It is claimed to be burglar proof, an anti-rattler and so arranged as to afford means for ventilation when desired. The lock is made of semisteel and is operated by a cam against the latch which holds the sash in any position desired. The action of the cam on

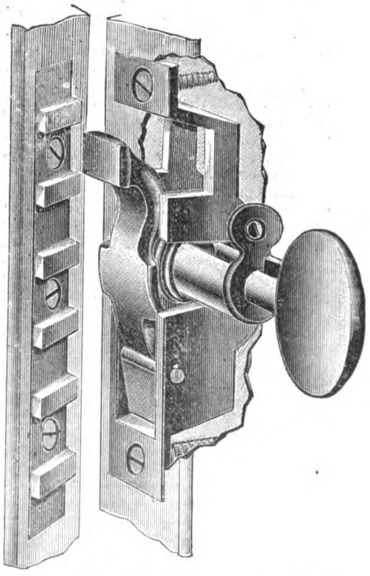


Fig. 7.—The Hubbard Window Sash Lock.

the lever presses it out of the lock, causing it to engage with an iron plate screwed to the sash, thus preventing the sash from being moved up or down. At the same time the pressure that is put upon the sash prevents its rattling or shaking. A careful study of the illustration will show the construction employed and the method of operation. The device is easily put in place and in operating it all that is necessary is to turn the key, which will lock or unlock the sash as required. An automatic action is provided so that if one should forget to turn the key and set the lever it will lock itself. The device is being introduced to the trade by D. S. Hubbard, Son & Co., Bay Shore, Long Island, N. Y., and the claim is made that the lock can be mortised in the window frame either side, high up or low down, and with the lock either side, in or out. The locks are made for one or two sash, with double locks for two weighted sash or two single locks for two sash without weights for the same window. The locks being mortised in the side of the window frame leaves the meeting rails free and clear to wash, paint or dust, and saves the unsightly hole and the splitting of the cross bars often resulting from the use of meeting rail fasteners. For purposes of ventilation the sash can be raised an inch or more top and bottom and securely fastened, thus rendering the device of especial value for use in connection with sick rooms, school rooms, hospitals and, in fact, any place where ventilation is necessary. The statement is made that the lock cannot be seen nor opened from the outside and can only be opened from the inside with its own key, which can be removed and put away. In the illustration presented herewith a part of the window frame is cut away so as to display the construction of the lock. With the lock the manufacturers send out explicit directions for putting it in place, so that any one can readily apply it.

TRADE NOTES.

ALFRED W. WOODS, 109 South Tenth street, Lincoln, Neb., shows in his advertising card this month an illustration of what he terms a "Key to the Steel Square." By means of it the figures to use on the steel square for the lengths, cuts and bevels for all rafters are presented, as well as the figures for obtaining polygonal miters, hopper cuts, &c. The device is 3 inches in diameter and is complete with a book of instructions, which is contained in a morocco case suitable for the pocket. The price of the "Instructor," as it is called, is $1.50 postpaid.

OWING to the receipt of numerous complaints from dealers in and consumers of Ruberoid roofing that inferior imitations of it have been sold under the claim that they were the genuine article, the Standard Paint Company, 100 William street, New York City, has sent out a circular letter to the trade of the United States contradicting these statements, and stating that it is now, "always has been and will continue to be the only manufacturer of Ruberoid roofing in the world and has no connection with any other manufacturer of roofing." The company further states that it does not manufacture any other roofing than Ruberoid; that it is and always has been made at Bound Brook, N. J., where the Standard Paint Company has its only American factories; that the ingredients employed in the manufacture of this roofing are known and used exclusively by the company; that all roofings similar in appearance to Ruberoid are imitations, and have not, either directly or indirectly, been authorized by, nor have they received the sanction of, the company, and that to identify Ruberoid roofing the registered trademark "Ruberoid" is stamped on the under side of each length every 4 feet.

THE ENERGY ELEVATOR COMPANY notes quite an increased demand for both power and electrically operated elevators, and orders for a number of each have been taken. Hand elevators also continue in good demand, and deliveries of this type of lifts have been made to Bucknell University, Lewistown, Pa., and other parties. A special invalid lift is being installed at Rosemont, Pa., while a large electric elevator is to be installed at the Lester Piano Works, Lester, Pa. A power basement lift is to be furnished the Arcade Building, this city, and a number of hand power freight lifts are being furnished a number of local customers.

"ARCHITECTURE TAUGHT BY MAIL" is the subject of the announcement presented in another part of this issue by the American School of Correspondence, Chicago, Ill. The courses in architecture are prepared for the purpose of helping those who for any reason have been unable to attend a resident technical school and to aid experienced draughtsmen and practicing architects. The instruction is planned to cover the actual problems arising in daily work. A 200-page illustrated bulletin giving full outline of the courses taught can be obtained on application.

WE have received with the compliments of the Bourse, Philadelphia, Pa., a memorandum calendar for the new year. It is of the same general style as those which have been sent out for some time past, the leaves being arranged in the form of a pad but provided with a metal loop for hanging up. Each leaf carries the calendar for a week with spaces for memoranda for each day. The back of the pad is of heavy cardboard, which carries a calendar for 1906 and the first half of 1907.

WE UNDERSTAND that the Gem Publishing Company, P. O. Box 14, Brooklyn, N. Y., has in course of preparation a new and enlarged edition of its A. B. C. Schedules, these being artistically finished in green paper covers with red lettering. The schedules include the items of hotels, schools, factories and apartment houses, thus covering some of the more important classes of buildings in connection with which there is at present a great deal of activity.

THE CANTON STEEL CEILING COMPANY has removed to its new building, 525 West Twenty-third street, New York City, where it enjoys enlarged facilities for the conduct of its growing business.

SCOTT & CO., 233 East Front street, Cincinnati, Ohio, present in our advertising pages this month some interesting facts about "Asteroid" roofing, which is referred to as a strictly "high-grade felt roofing, containing no coal tar," and is water proof. It is suitable for flat or steep roofs, is claimed to be unaffected by acid, alkali or gas fumes and requires no special tools to apply. The point is made that it is a most admirable fabric for general building and insulating purposes. It is interesting in this connection to state that the company has for 33 years manufactured painted and galvanized iron and steel roofing, corrugated roofing and siding, as well as all other sheet building materials.

THE NEW BELLEVUE - STRATFORD Hotel, which has just been completed in Philadelphia, is said to have one of the best and most modern equipments of its kind in the country. Among the various devices are 33 double gear door hangers and locks, made by the Reliance Ball Bearing Door Hanger Company, 1 Madison avenue, New York City.

D. S. HUBBARD, SON & CO., 259 Third avenue, Bay Shore, N. Y., make the statement in their advertising card this month that Hubbard's Window Sash Lock is not merely a catch, but a lock which is intended to stop burglars; prevents rattling sash; keeps out the wind and rain, and while doing all these is invisible to the eye. The manufacturers state that canvassers are wanted, and that terms, circulars, &c., can be had on application.

A LITTLE PAMPHLET of 12 pages sent out by the J. A. Fay & Egan Company, 221 to 241 West Front street, Cincinnati, Ohio, is devoted to a list of second-hand wood working machines they at present have in stock. In order to introduce new and improved tools the manufacturers state that they are obliged in some cases to take in exchange machines which have only been in use a short period and which are consequently termed "second-hand machines," although practically the same as new. In order not to allow these machines to accumulate, the company offers them at greatly reduced prices. Each machine is thoroughly adjusted, every part put in first-class working order and tested at the works before shipment.

THE FOREST CITY BIT & TOOL COMPANY, Rockford, Ill., is introducing to the trade various lines of carpenters' tools which cannot fail to interest a large class of our readers. Special reference is made in the advertisement of the company in another part of this issue to wood boring bits, hollow mortising chisels and to common mortising chisels and tools. These goods are illustrated and described in what is known as Catalogue "G," a copy of which can be had on application.

THIS is the season when the question of heating is prominently before house owners, architects and builders, and they are likely to be interested in what the Schafer Furnace Company, Youngstown, Ohio, has to say this month regarding the equipment which it is offering at attractive prices. The figures for its work are given in the company's advertisement, and the statement is made that an illustrated instruction book will be sent free to any address if mention is made of *Carpentry and Building*.

THE December number of *Graphite*, which is issued by the Joseph Dixon Crucible Company, Jersey City, N. J., contains the usual amount of interesting information regarding Dixon's graphite productions and some of their various applications. Special reference is made to lubrication, with incidental remarks on graphite paint, with a short chapter on "Steam and Return Pipes for Heating Systems," by W. H. Wakeman. Omission should not be made of the "New Year Thoughts," by Vice-president and Treasurer John A. Walker, an excellent likeness of whom appears in connection with the article.

IN a pamphlet sent out by the C. & A. Patented Building Construction Company, 170 Broadway, New York City, is presented much interesting information relative to the subject of machine made or portable houses, which are at the present time extensively used throughout the world, more particularly perhaps at the seaside and in tropical localities where building timber suitable for the purpose is not always readily available. The company points out that the great demand for portable buildings has warranted an increase in its facilities and it is now prepared to manufacture buildings of all descriptions and of unlimited size. The portable construction is made entirely by machinery, in sections easily handled and after attractive models of architectural design. Accompanying the catalogue are a number of plates carrying half-tone reproductions of photographs of various styles of buildings which the company has furnished. These for the most part are one-story structures of a type particularly adapted for use as summer cottages and in the tropics. A second pamphlet sent out by the same concern is devoted exclusively to photographic reproductions of attractive designs of cottages, accompanied by floor plans showing the general arrangement of the rooms. There are also numerous interior views, giving one an idea of the way in which they can be furnished.

THE December issue of *Cortright Metal Shingle Advocate* contains the usual amount of interesting matter pertaining to Cortright shingles, together with seasonable remarks both of a humorous and serious nature. The little sheet is issued regularly on the first of each month by the Cortright Metal Roofing Company, Philadelphia, Pa., and Chicago, Ill., and is one of the methods adopted by the company for pushing the sale of its goods.

A CONSOLIDATION has just been effected by the Simonds Mfg. Company and the Culley File Works of Fitchburg, Mass., the new concern being known as the Simonds File Company. The officers are: President, Daniel Simonds; vice-president, Walter E. Culley; treasurer, Albert E. Culley, and secretary, John E. Kelley. The board of directors consist of the officers named, together with Gifford K. Simonds, A. T. Simonds and T. Fred Howarth. The new company, which is incorporated under the laws of the State of Massachusetts, has taken over the plant and business of the Fitchburg File Works, makers of files, hack saws, hack saw frames and kindred articles.

THE wave of popularity with which hollow building block construction is sweeping over the country lends added interest to the announcement presented in our advertising pages this month by the Ideal Concrete Machinery Company, South Bend, Ind. The four cardinal points combined in the Ideal Hollow Concrete Block Machine turned out by this concern are said to be "simplicity, rapidity, adaptability and durability." The claim is made that there are no wheels, chains, cogs or gear cranks to clog, break or get out of order, and therefore there is no loss of time or labor in operating the machine. A catalogue illustrating and describing the machine and giving other information of interest in this general connection has been issued by the manufacturer, and a copy of it can be had on application.

No. 0575.

WADDELL MFG. CO.,

Corner Taylor and Coldbrook Sts.,
GRAND RAPIDS, MICH., U. S. A.

Manufacturers of

Wood Carvings

Hand and Machine Carvings, Mouldings, Festoons, Newel Posts, Head Blocks, Rope and Twist Balusters and Ornaments.

Almost 1,500 designs illustrated in our new catalogue and price-list No. 20. Mailed for 15c. in stamps.

Going to Build?

OUR CATALOGUE #25 WITH PLANS AND PLATES, TELLS YOU ALL ABOUT IT, 800 PAGES, 6000 DESIGNS.

SEND 20¢ FREE FOR POSTAGE

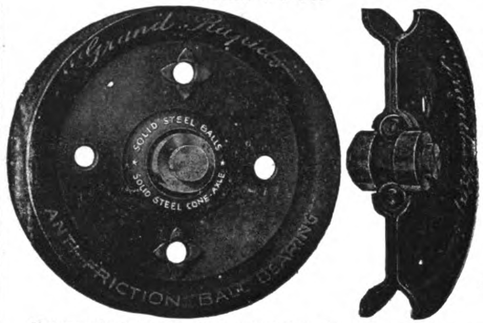
THE FOSTER-MUNGER CO., CHICAGO, U.S.A.

HARDWOOD VENEERED DOORS, ART GLASS, BLINDS, COLONIAL COLUMNS, PORCH WORK, SASH, ETC.

COLONIAL COLUMNS

ANY SIZE OR DESIGN
JOINTS DON'T OPEN
AMERICAN COLUMN CO. LTD.
BATTLE CREEK MICH.

PATENT PENDING.



"Ball-Bearing" Grand Rapids All-Steel Sash Pulleys

Are sold DIRECT to BUILDERS, CONTRACTORS and MILLS,

At prices under the common ordinary goods.

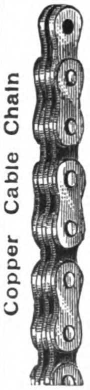
If you make ten or ten thousand window frames, we can save you money and give you a superior sash pulley. We are the largest sash-pulley makers in the world. We ship direct, or through dealers and jobbers everywhere.

Write for catalogue and free samples and prices on half-gross, gross, barrel or any quantity.

Direct from the Makers to you. Inquiries welcome.

GRAND RAPIDS HARDWARE CO.,

3 PEARL STREET, - - - GRAND RAPIDS MICH.



THOMAS MORTON,

169 Elm Street, New York.

Copper Cable, Champion Metal,
Steel Cable, Steel Champion,

SASH CHAINS.

CHAINS

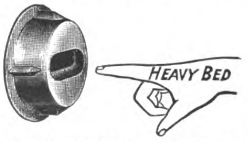
For Suspending Heavy Doors, Gates, etc.
All of SUPERIOR QUALITY.

THE IVES' PATENT WINDOW STOP ADJUSTER

PATENTED

FOR WINDOWS AND SLIDING DOORS

Insures Protection against Cold Draughts, Dust, Rattling or Binding.



The that only Window Stop Adjuster made from one piece of metal that has a heavy bed will not bend or cup in tightening the screw.

THE H. B. IVES CO.

40 Page Catalog mailed free. **New Haven, Conn., U. S. A.**

No. 225—48x12 inches, **$3.60.** Retail value, $7.00.
No. 230—48x14 inches, with Curtain Pole, **$4.50.** Retail value, $9.00.

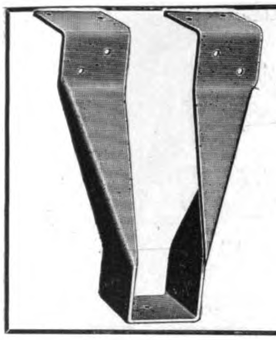
Others from $2.50 up. Largest assortment. Division Screens and special Grilles to order.

Grilles "Direct from Factory" Mantels

TILE of Every Description, for Walls and Floors. Ceramic Mosaic-Enamels, etc.

$13.25 buys this solid oak Mantel, 80 in. high, 54 or 60 inches wide, 28 x 16 Mirror. Heavy columns and elaborate capitals. Tile facing and hearth. Plated Club House Grate, $10.00.

Write for catalog of Mantels, Grates, Tiles for floors and baths, Slate Laundry Tubs, Grilles, etc. It is free. Or send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from $12 to $200. **W. H. OSTENDORF, 2417 N. Broad St., Philadelphia, Pa.**



ASK YOUR DEALER FOR

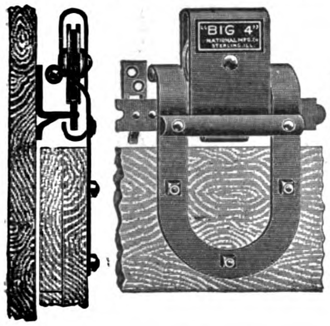
Lane Bros. Co.

JOIST AND TIMBER HANGERS.

Made in more than one hundred listed sizes. Any special size or modification to order.

Manufactured by

Lane Bros. Co.,
(THE DOOR HANGER MFRS.)
423-455 Prospect St., POUGHKEEPSIE, N. Y.



"BIG 4" FLEXIBLE DOOR HANGER.

Anti-Friction. Cannot Jump the Track.
Exclusive Sale Given.

NATIONAL MFG. CO.,
STERLING, ILL.

Carpenters and Builders, Attention

Our large catalogue is now ready to be sent to you. If your name is not on our mailing list ask us for this book.

This is the most complete SASH and DOOR catalogue with *net prices* ever published.

The Carpenter who uses our prices in figuring his work will surely get the job.

Write to-day. Don't put off.

SCHALLER-HOERR COMPANY,
CHICAGO, ILL.

Grand Rapids Wood Carving Co.,

GRAND RAPIDS, MICH.

Catalogue on application.

The Kidder's Pocket Book

Features of the new 14th edition of Kidder's Architects' and Builders' Pocket Book, are 1656 pages of fine thin paper with gilt edges and rounded corners and an elegant flexible binding. Price, Five Dollars, Prepaid. For an idea of the contents send for our 16 page circular.

DAVID WILLIAMS CO.,
14-16 Park Place, New York.

RAYMOND'S

COMPRESSED-LEAD SASH-WEIGHTS

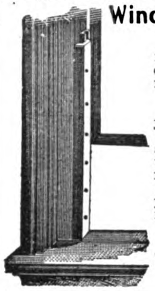
With Wrought and Malleable Iron Fastenings. The only Lead Weight made with Secure Fastenings.

SMOOTH FINISH.

Twice the heft of Iron. Occupy only half the space. No Friction. No Noise. Each Weight centered, making it hang perfectly true and plumb. Indorsed by all the leading Architects and Builders. Prices no higher than the ordinary Cast-Lead Weights. Send for Circular. Orders filled at sight.

RAYMOND LEAD CO.,
LAKE and CLINTON STS., - CHICAGO, ILLS.

King's Automatic Weather Strip. Window and Door Stop.



The only perfectly satisfactory weather strip, window and door stop on the market.

Keeps out cold and dust.

Makes a perfectly tight joint.

Windows can be raised and lowered to desired position without the use of fasteners or of weights.

Do not build a house until you have investigated the merits of these strips.

Write for prices.

MANUFACTURED BY
The King Manufacturing Co.
Newton, Ia.

Key to the Steel Square

It is a wonderful instructor. It instantly gives the figures to use on the common steel square for the lengths, cuts and bevels for all rafters. It also gives the figures to use for all polygonal miters, hopper cuts, etc. Size, three inches in diameter, complete with book of instruction, all in morocco case suitable for the pocket. Can be consulted at a moment's notice.

Price, post paid, $1.50

Send express or money order to

ALFRED W. WOODS
109 So. Tenth St. Lincoln, Neb.

HUBBARD'S WINDOW SASH LOCK

Not merely a catch but a lock. Stops burglars, rattling sash, wind and rain. It does all this and is out of sight Safe for ventilation, etc.

$3.00 Per doz. 25c. Each

Liberal offer. Canvassers wanted. For terms, circulars, etc. apply to

D. S. HUBBARD, SON & CO.
259 Third Ave.. Bay Shore, N. Y.

LORENZEN MANTELS

AND GRILLES

Also contractors for Ceramic Mosaic and Tiles, Interior and Decorative Marbles, also manufacturers of Improved Scagliola for Bathrooms, Vestibules and Interior of Lobbies and Corridors in Banks, Libraries, Hotels and Public Buildings.

To Carpenters and Builders. FREE.

We will mail our large, handsome 96 Page (10 x 12) Catalogue, the largest Mantel and Grille book ever published, which costs us nearly 50 cents. Send us your business card and we will show you a way to make money by becoming our sales agent for your territory.

Write To-day.

CHAS. F. LORENZEN & CO., Inc
253 North Ashland Ave., Chicago.

We have just shipped a carload of our Mantels and Interior Finish to the United States Legation Buildings, Pekin, China.

LORENZEN PAYS THE FREIGHT

THE AWB CO.

A BARGAIN.

QUARTERED OAK MANTEL

with veneered quartered oak columns,
BEVELED PLATE MIRROR
polished and rubbed finish, tile facing
(slabbed), and steel summer front.

We will deliver this mantel anywhere East of the Mississippi River for . . **$18.00**

Write to-day for 40-page Catalogue showing full line.

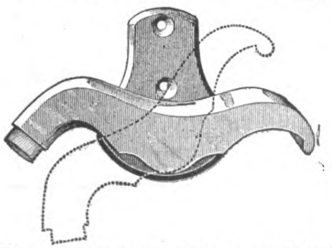
The A. W. Burritt Co.
"THE MANTEL FOLKS"
400 Knowlton St., Bridgeport, Conn.

Address Dept. A.

THE AWB CO.

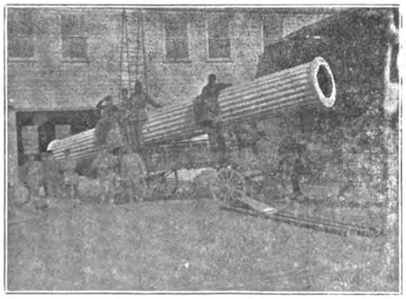
EMPIRE DOOR HOLDER

IMPROVED



Holds the heaviest doors on polished floors. 50% greater pressure than any other. Easy to put on, easy to use; the toe operates it. Write for circulars to

CALDWELL MFG. CO.,
5 Jones Street, Rochester, N. Y.



THE LARGEST LOCK JOINT COLUMN EVER BUILT.

40½" in diameter, 33-10 in. long.

One of four furnished by us for the Portico of the Allenhurst Club.
Allenhurst, N. J.

HARTMANN BROS. MFG. CO.
Mt. Vernon, N. Y., U. S. A.
New York Office: 1123 Broadway.
Also
Henry Sanders Co., Chicago, Ill.
A. J. Koll Planing Mill Co.,
Los Angeles, Cal.

MANUFACTURERS OF
KOLL'S PATENT LOCK JOINT COLUMNS FOR PERGOLAS, PORCHES OR INTERIOR USE.
Send for Catalogue D 19.

EVERY Builder who reads, investigates and progresses will have a copy of Kidder's Strength of Beams, Floors and Roofs. $2.00 prepaid.
DAVID WILLIAMS CO., 14-16 Park Place, N. Y.

THE FORBES FURNACE

You run no risk in putting in the Forbes Furnace.

Every one guaranteed if properly installed. No sheet iron drums—entirely cast iron radiating tubes ½ inch thick. Will wear for years.
Send for new catalogue and full particulars.

TUBULAR HEATING AND VENTILATING CO.
228 QUARRY ST., PHILADELPHIA PA.

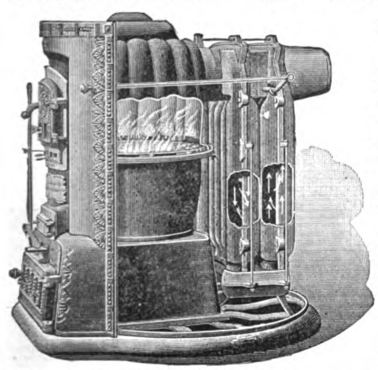
We Make HEATERS of every { Kind, Size, and Price.

A complete line of Steam and Water Boilers, Furnaces and Combination Heaters. 1842-1905. Over 60 years' experience. Ask for Catalogue. Mention *Carpentry and Building* and state mode of heating and style preferred.

International Heater Co.,
UTICA, N. Y.

New York,	Boston,	Chicago,
1 Madison Ave.	198 Spruce St., Chelsea.	48 Dearborn St.

THE BEST IS THE CHEAPEST



The BENGAL FURNACE

has stood the crucial tests imposed upon it in various places and always came out the victor.

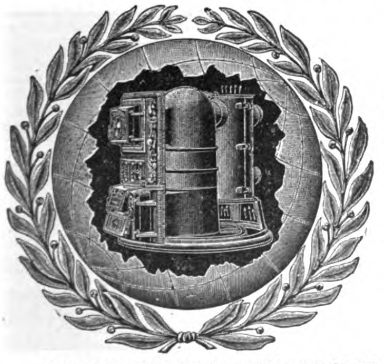
The best evidence of its superiority is that imitators are trying to sell their wares on the merits of the BENGAL, saying it is "just as good."

There are none "just as good."

Full particulars on application.

THE FLOYD-WELLS CO., - Royersford, Pa., U. S. A.

"LOW DOWN" CROWN WARM AIR FURNACE



Particularly adapted for low cellars and for long distance heating—using either hard or soft coal or coke.

Simple in construction and operation, easy to repair.

Most efficient furnace for churches, schools or residences.

Made by furnace experts in the finest furnace shop in the land.

Write for prices and detail catalog.

MARCH-BROWNBACK STOVE CO., POTTSTOWN, PA.

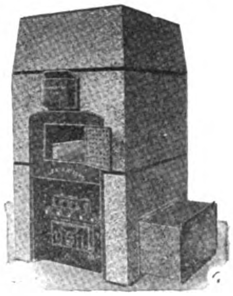
"How to Set Up Your Own Furnace"

Free

Whether you're building a new house or have an old one; whether it is a school, store, church or other place to heat, you need our brand new illustrated furnace book, "Modern Furnace Heating." It is valuable, instructive; a 40-page book that explains the mysteries of house heating, ventilating, where to put the furnace, how to locate the registers, pipes, chimney, etc. It tells how to warm fresh oxygen from outdoors, without introducing cold drafts. A detailed explanation is given of how we sell the

No. 45 Leader Steel Furnace

for $49 and pay freight east of Omaha; how you can set up this furnace without expert help from plans we furnish free. Write for this excellent book. It s free. Send us a plan of your building. We'll send estimate free. Do it now.



Hess Warming & Ventilating Company,
709 Tacoma Building, Chicago, Ill.

Furnace $39 **Pipes and Registers, $2 a Room.** Not 1c of profit to Us until You are satisfied, **In Spring.** Why not save **$50?** Set up your own furnace. Thousands now do this. Illustrated Instruction Book free if this paper is named. Address Schafer Furnace Co., Youngstown, Ohio.

The New Book

"Strength of Beams, Floors and Roofs"

Makes easy the Designing and Figuring of Wooden Beams and Trusses.

TWO DOLLARS, PREPAID.

David Williams Company,
Publishers.
14-16 Park Place, New York.

SASH CHAIN

CABLE CHAIN

JACK CHAIN

The SMITH & EGGE MFG. CO.
Bridgeport, Conn.

Manufacturers of "Giant Metal" Sash Chains
" " "Red Metal" " "

Cable Chains, Jack Chain, Bell Hangers' Chains and Plumbers' Chains
Made in Brass, Copper and Steel

WRITE FOR CATALOGUES AND PRICES

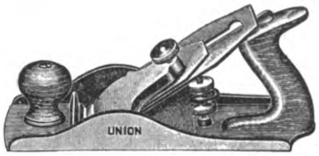
We are the ORIGINATORS of SASH CHAIN as a SUBSTITUTE for sash cord

BUY . . . . LUMBER DIRECT

WE MANUFACTURE ALL KINDS.—MOULDINGS, WINDOWS DOORS, BLINDS. MIXED CARS, INCLUDING EVERYTHING FOR A BUILDING. STRAIGHT CAR-LOADS SHINGLES, SIDING, FLOORING, WHITE PINE, AT WHOLESALE PRICE.

"Our complete Catalog and Price List of all kinds of Building Material would be a great help to you in figuring."

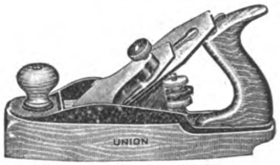
LESTERSHIRE LUMBER & BOX CO., LESTERSHIRE & BINGHAMTON, NEW YORK.


Union X4 Iron Smooth Plane.

THE GOOD WORKMAN DEMANDS

GOOD TOOLS

UNION "X" PLANES

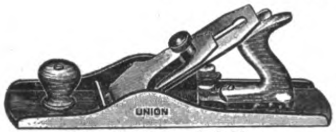

Union X85 Wood Smooth Plane.

Supply that demand, and it is not difficult to convince the Good Workmen of the Country that they are the Planes they want. They are rigid and solid, easy of adjustment, but a Plane that will "stay set" when adjusted.

A FIRST-CLASS PLANE

The cutters are of heavy steel and the same thickness throughout. This feature, together with the solid Frog, make a Plane that WILL PLANE. Every essential feature of it is right, and properly designed, and properly made.

Send for our No. 5 Catalogue, which shows the full line of Planes, Scrapers, etc, etc.
It will interest you.


Union No. X5 Iron Jack Plane.

Union Manufacturing Co.,
NEW BRITAIN, CONN., U. S. A.
WAREHOUSE: 103 Chambers St., New York.


Union No. X26 Wood Jack Plane.

THE AKRON ECLIPSE LEVELS Manufactured by The BAKER McMILLEN CO. AKRON, OHIO.

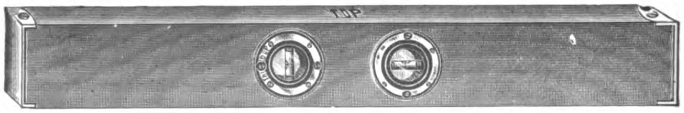
We have a proposition that will interest every carpenter. Drop us a postal and we will send it to you.

WORTHLEY'S
PATENT
SLOW FEED MANGER
17-Inch Size, $1.60 each.
U are welcome to a copy of our
VANE CATALOGUE
BROAD GAUGE IRON STALL WORKS,
53 Elm St., Boston, Mass.

FOREST CITY BIT & TOOL CO., Rockford, Ill., U. S. A.

Manufacturers of
Wood Boring Bits, Hollow Mortising Chisels, Common Mortising Chisels and Tools.
Send for CATALOG "G" Send for

COOK'S LEVEL



For Carpenters, Machinists, Masons.
MADE OF WOOD, IRON, ALUMINUM.
Of all Dealers, or Catalogue on Request.
EVERY LEVEL WARRANTED.
DAVIS & COOK, Watertown, N. Y.

The Champion Wrought Metal Base Knobs
NEVER BREAK
(TRADE MARK)

Can be screwed into hardwood without injury. Ingeniously constructed rubber button easily replaced. Made in either Steel, Brass or Bronze and all Finishes to match other hardware. Manufactured only by
THE CHAMPION SAFETY LOCK CO., Geneva, O.

"Forstner" Brace and Machine Bits

For Fine Carpenter, Cabinet and Pattern Work

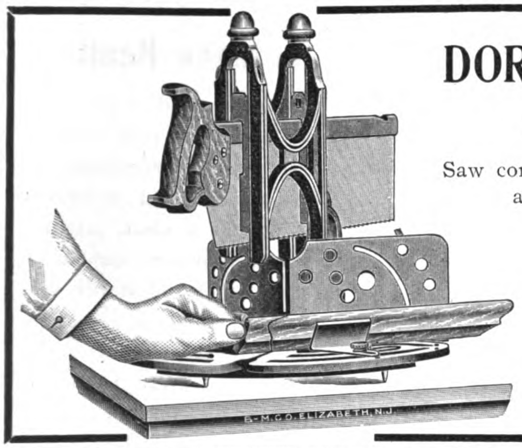
Specially Adapted for Hardwood Working.

The Forstner Labor-Saving Auger Bit, unlike other bits is guided by its *Circular Rim* instead of its centre; consequently it will bore any arc of a circle and can be guided in any direction regardless of grain or knots, leaving a true polished surface. It is preferable and more expeditious than chisel, gouge, scroll-saw, or lathe tool combined, for core-boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon moulding and mortising, etc.

Manufactured by

The Progressive Mfg. Co., Dept. "A", Torrington, Conn.

Enquire of your Hardware Dealers or write us direct. Supplied in Sets. Write for Catalogue.

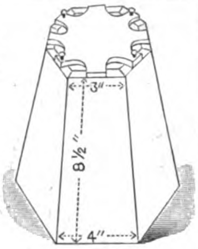


DORN'S REVOLVING MITRE BOX

Saw compound as well as plain mitres any width with a back saw 4 inches wide.

Send For Booklet

It tells the story



Compound Mitre

MANUFACTURED BY

BRAUNSDORF-MUELLER CO.

1093 E. Grand St., ELIZABETH, N. J.

You Can't Get Along Without Them. Don't Try.

Thousands of mechanics have written us after receiving our books that they are simply indispensable to them, and they can be obtained so easily it is foolishness for anybody to be without them.

← This book is most complete in information about wood working tools and

← this one is just as complete and indispensable to anybody who wishes to post himself or to find out where to buy metal working tools, machinery and supplies.

Gladly sent to anybody anywhere on receipt of 25 cents each.

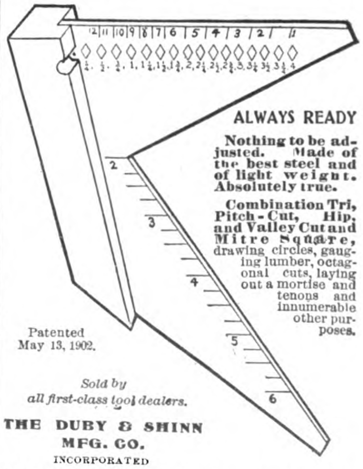
The Chas. A. Strelinger Co.,

Box B. **DETROIT, MICH., U. S. A.**

New Universal Square.

Made in Three Sizes

No. 1	6 inches	-	$0.65
No. 2	10 inches	-	1.00
No. 3	13 inches	-	1.50



ALWAYS READY

Nothing to be adjusted. Made of the best steel and of light weight. Absolutely true.

Combination Tri, Pitch-Cut, Hip, and Valley Cut and Mitre Square, drawing circles, gauging lumber, octagonal cuts, laying out a mortise and tenons and innumerable other purposes.

Patented May 13, 1902.

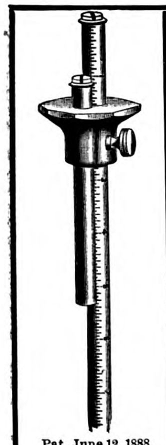
Sold by all first-class tool dealers.

THE DUBY & SHINN MFG. CO.
INCORPORATED
Nelson Bldg. 19 Park Place New York City

Price $1.00 Ask your dealer or write me.

Filing cross cut saws has no terrors when you use the Scientific Saw Holder. Patented Aug. 16, 1904.

T. D. GAYLE, - Council Bluffs, Iowa.

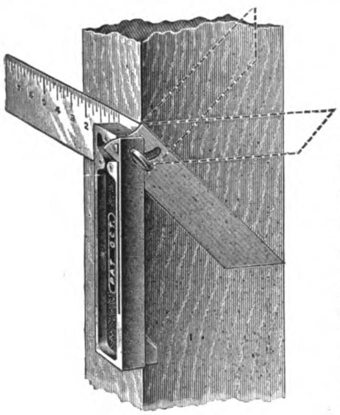


Pat. June 12, 1888
Other pat's pending

Barrett's Improved Combination Roller Gauge

Appeals to all practical carpenters. It is quickly adjusted with only one screw, direct from the centre, fastening both beams in their proper place. A simple device holds the beams in position while being adjusted. It is accurately made and finely finished. One trial will convince any carpenter of its many advantages over all others. Insist upon having the Improved Style, adjusted by one screw.

The Leavitt Machine Co.,
Sole Manufacturers,
Orange, Mass., U.S.A.

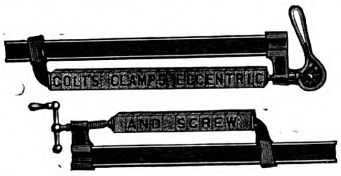


SOMETHING NEW

Ideal Bevel Try Square

By having this combination try square you save time, also the price of one tool. You can see by cut how easy it is to change the bevel blade to any desired position to make the square and bevel cut with one stroke of the pencil.

NICHOLLS MFG. CO., OTTUMWA, IOWA.



I & U Shaped Steel Bar

Any Length Desired.
QUICK ACTING. TIME SAVING.
Catalogue free.

BATAVIA CLAMP CO.
23 Center Street, BATAVIA, N. Y.

The Carpentry and Building Series of Designs

COMPRISES FOUR ELEGANTLY PUBLISHED VOLUMES,

No. 1. Cottage Designs with Constructive Details.
Range of Cost, 600 to 1,500 Dollars

No. 2. Low Cost Houses with Constructive Details.
Range of Cost, 750 to 2,500 Dollars

No. 3. Modern Dwellings with Constructive Details.
Range of Cost, 2,000 to 5,000 Dollars

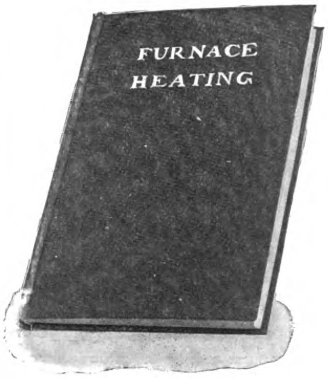
No. 4. Suburban Homes with Constructive Details.
Range of Cost, 3,000 Dollars Upward

It has been aimed to make the Carpentry and Building Series the most complete collection of designs published for the use of architects, investors, and all who intend to build homes and are seeking suggestion with respect to design and arrangement.

These books represent the best and most practical in plans of moderate cost uburban dwellings, both in respect to the examples of houses treated and the exact and detailed method of illustration.

One Dollar Each, Postpaid.

DAVID WILLIAMS CO., Publishers, 14-16 Park Place, New York.



Furnace Heating

is from the hand of an expert in that kind of work. From a man widely experienced in the practice, and competent to present a clear practical treatment on the introduction of warm air apparatus into different buildings, on a scientific and economical basis.

The furnace man, the builder, the owner, who seeks solution of problems attending the designing and laying out of furnace work, may be safely governed by the rules and data here laid down.

He will find a discussion of :—

The types of furnaces and their efficiency.
The comparative merits of furnace and other systems.
The combination system.
The introduction of air and ventilation.
Heating and ventilating School Buildings, Public Buildings, Churches and Stores.
The Fan Furnace Combination System.
Temperature Control.
Estimates and Contracts.
Fuels, with Tables and Data.
And an appendix on Furnace Fittings.

By William G. Snow

170 Pages 90 Illustrations
$1.50 Postpaid

DAVID WILLIAMS CO.
Publishers
14-16 Park Place, N.Y.

FAR AHEAD for smooth, easy work and holding edge,
will be YOUR VERDICT ON TRYING

CHAPLIN'S IMPROVED PLANES

Patented Feb. 14, 1899; Oct. 30, 1900; Dec. 24, 1902.

We want you to have a copy of our booklet, just issued,

"A 'PLANE' TALK ABOUT A GOOD PLANE!"

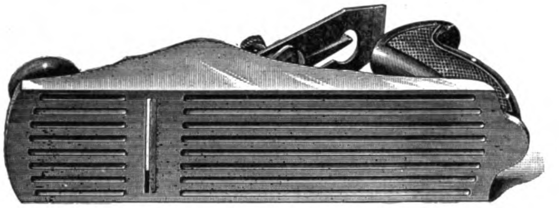
We want you to have a copy, for it is a booklet you really need in your business.

We'll gladly send you this booklet with our compliments, promptly upon receipt of your request.

May we send you a copy?

TOWER & LYON COMPANY,
95 CHAMBERS STREET, NEW YORK.

We Invite the



Severest Comparative Tests.

A NEW BOOK REPRINTED
FROM
CARPENTRY and BUILDING

Plank Frame Barn Construction

A neat cloth bound manual with ample description and illustration.

Contains some good examples in framing which will interest all builders and carpenters

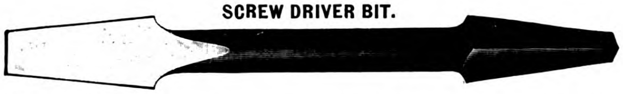
Fifty Cents, Postpaid.

DAVID WILLIAMS CO., Publishers,
14-16 Park Place, New York.

DEMAND and be sure to get

THE VICTOR

SCREW DRIVER BIT.



It is the Best that money can buy.
Each one carefully hardened and tempered by itself.
Examined, Tested and *Guaranteed Perfect.*

Drop Forged in assorted sizes.

KRAEUTER & CO.,
NEWARK, N. J.

HARGRAVE WOOD DRILLS

Made of the best material, forged and not milled. Especially adapted to hard wood, and will not be injured by coming in contact with a nail or screw, and having a longer point, cuts much faster than a metal drill. Bores a smooth hole in any direction; will not split the wood nor turn aside from the grain or knots. Speed and feed are entirely under the control of the operator.

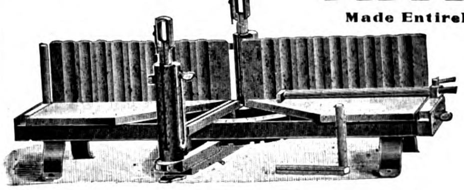
BEST { QUALITY, FINISH, DESIGN.

Specify these goods to your dealer. TAKE NO OTHER. Send six cents for cat. No. 200.

The Cincinnati Tool Co.
Norwood, CINCINNATI, O.

GOODELL MITRE BOX

Made Entirely OF STEEL.



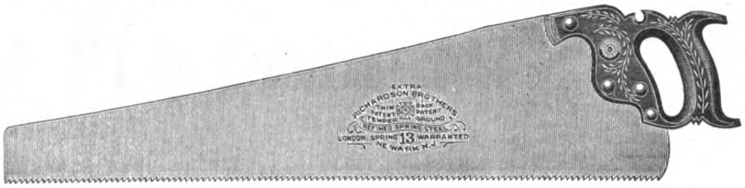
No More Breaking.

Most desirable Box on the market, being way ahead in quality and improvements.

Send for Folder.

GOODELL MFG. CO.,
GREENFIELD, MASS.

OLD RELIABLE RICHARDSON SAWS.

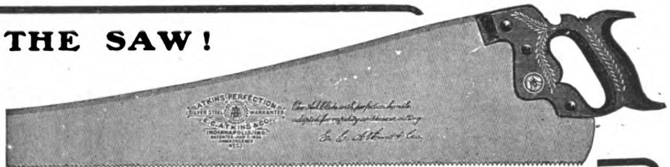


ESTABLISHED 1860.

The peer of them all. Try one and be
convinced. Every saw fully warranted.

NATIONAL SAW CO. Operating Richardson Bros. **NEWARK, N. J.**

THE MAN BEHIND THE SAW!



Behind a Hand Saw stand:—
The man who makes the steel;
The man who tempers and hardens it;
The man who grinds it;
The man who finishes it, and
The man who uses it!

Behind the **Atkins Celebrated Silver Steel Hand Saws**

stand the most skillful workmen among saw makers anywhere and the best carpenters who want the best tools and know them when they see and use them.

ATKINS
ALWAYS
AHEAD.

E. C. ATKINS & CO., Inc.,
Factories: - - INDIANAPOLIS, IND.

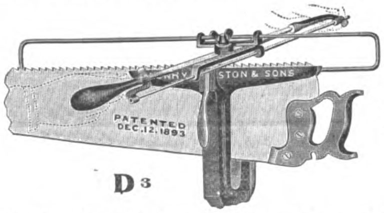
BRANCH HOUSES:—No. 64 Reade Street, New York City. Memphis, Tenn.
Atlanta, Ga. Minneapolis, Minn. Portland, Ore.
Seattle, Wash. Chicago, Ill. Toronto, Ont.

WRITE FOR OUR
FREE CARPENTER'S
TIME BOOK.
Mention this paper.

DISSTON Filing Guide and Clamp.

Especially Designed to assist those not skilled in the art to file a saw correctly.

IT'S PRACTICAL
SEND FOR
DESCRIPTIVE
CIRCULAR.

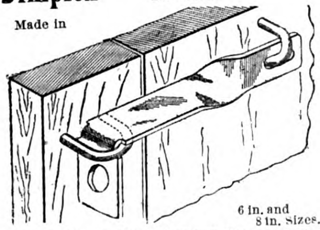


THIS GUIDE IS
FITTED TO THE
DISSTON Nos. 2 and 3
CLAMPS.

HENRY DISSTON & SONS, INC.,
KEYSTONE SAW, TOOL, STEEL & FILE WORKS,
PHILADELPHIA, PA.

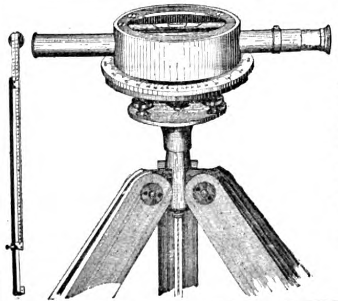
"Simplex" HASP and HOOK IN ONE.

Made in



6 in. and
8 in. Sizes.

Ask your dealer for the "Simplex" Pat. Hasp Hook
If he does not carry it, write us for sample and prices.
For Sale by all Jobbers.
THE WOODHOUSE HDW. MFG. CO
ST. LOUIS, MO.



WHAT BUILDERS HAVE BEEN LOOKING FOR

BOSTROM'S
Improved Builders' Level

An absolutely reliable leveling instrument for Architects, Builders, Carpenters, and Stone Masons. Can be used for any kind of foundation work and getting angles, is simple in its construction, easily understood, and can be operated by any one. Is made of Brass, oxidized, and has a silvered circle of degrees. Has achromatic Telescope of ample power for such work. Price including Plumb Bob, Tripod and Graduated Rod and Target, $20.00. Write for circular and be convinced. Every instrument guaranteed.

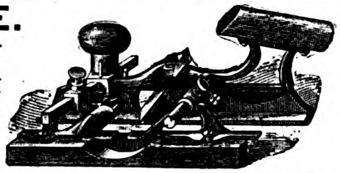
BOSTROM-BRADY M'F'G CO.,
53½ West Alabama Street,
Atlanta, Ga.

FALE'S PAT. PLANE.

Constituting Carpenter Plow, Dado, Filletster, Matching Sash, Hollows, Rounds, Beads, Rabbets, Nosings, Case Mouldings, Quarter Rounds, &c. The most Compact and Serviceable Tool ever invented. Universally endorsed by carpenters.

AGENTS WANTED.

OTIS A. SMITH, Sole Mfr., Rockfall, Conn.



An Instant Cure For Slipping Belts!

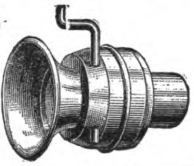
DIXON'S
SOLID BELT DRESSING.

WRITE FOR A FREE SAMPLE.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

W. R. OSTRANDER & CO., 22 Dey Street, New York City,

Manufacturers of
Speaking Tubes, Whistles, Elevator, House and Hotel Annunciators and Bells, Electric Light Supplies.
Send for Catalogue.



Factory, 1431-1439 DeKalb Avenue, Brooklyn.

"Yankee" Tools.

No. 41—AUTOMATIC DRILL.

No. 42—AUTOMATIC DRILL.

No. 50—RECIPROCATING DRILL FOR WOOD OR METALS.

The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up to date mechanic could buy tools of their quality and character. Other tools are very good tools, but "Yankee" Tools are better. "Yankee" Tools are sold by all leading dealers in Tools and Hardware. Ask your dealer to see them. Our Yankee Tool Book tells all about them. Sent free by

NORTH BROS. MFG. CO., Philadelphia, Pa.

A TOOL THAT'S STAMPED
STANLEY
IS THE BEST OF IT'S KIND

IMPROVED CARPENTERS' TOOLS

Sold by all Hardware Dealers

Stanley Rule and Level Co.
NEW BRITAIN, CONN., U. S. A.

A COMPLETE FRAMING RULE
ON
NICHOLLS FRAMING SQUARE.

On the square is where the carpenter wants his figures, not in a book or on a piece of paper, as they are usually lost.

NICHOLLS MFG. CO.,
OTTUMWA, IOWA.

We have **now ready** our

NEW ILLUSTRATED CATALOGUE No. 19

devoted exclusively to

Wood Workers' Tools.

Containing **250** pages, **1100** illustrations, handsomely printed on good paper, it makes a convenient and valuable book for **all woodworking mechanics.**

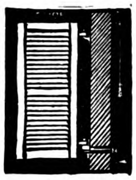
Sent to any address on receipt of 10 cents postage.

Wm. P. Walter's Sons,
TOOL HEADQUARTERS
1233 Market St., Philadelphia.

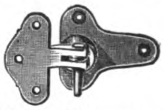
Mallory Shutter Worker.

Works and locks the blinds from the inside. Ornamental, durable, perfect working. Applicable to old or new buildings.

Manufactured by
MALLORY MFG. CO.,
Flemington, N. J.



HALE & BENJAMIN'S



Patented Automatic Blind Hinges

Flush and surface for wood and brick building. Easy to put on, strong and durable. **Warranted.** Also combination awning hinges. With these hinges blinds will not slam or blow off. They are the only hinges adapted to bay or mullion windows, as they require no other fixtures. Testimonials on request from dealers, contractors, and people who have used them several years. We are the sole owners of these two patents. If your dealer does not keep them write to

PARKER WIRE GOODS COMPANY,
Manufacturers,
No. 1 Assonet Street, Worcester, Mass.

Use Our
Folding and Adjustable Handle Draw Knife!

It is adjustable to any position, adaptable to the awkward places, absolutely rigid when set, handy and compact, a time saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

Write for Prices and Discounts.

A. J. WILKINSON & CO.,
180-188 Washington St., Boston, Mass., U.S.A.

The Rich Handy Drawing Outfit

Saves Time

for the draughtsman, and is a great aid to the learner. It holds a number of sheets or a pad, which requires no fastenings. **The Protractor T Square** gives accurate angles. You get measurements direct from the board. Has a drawer for instruments, and can be carried around to make drawings on the spot. Circulars free.

J. & G. RICH, 122 N. 6th St., Phila., Pa.

Alphabetical List of Advertisers.

Classified List of Advertisers.

Air Compressors
Mietz, A.

Annunciators
Ostrander, W. R. & Co.

Architects' Details
Lestershire Lumber & Box Co.

Asbestos
Stowell Mfg. Co.

Auger Bits
Ford Auger Bit Co.
Jennings, C. E. Co.

Awnings
Chattanooga Roofing & Fdry. Co.
O. K. Harry Steel Works

Band Saws
American Wood Working Machinery Co.
Cordesman, Meyer & Co.
Crescent Machine Co.
Fay, J. A. & Egan Co.

Barrel Swings
Leavitt Machine Co.

Bath Fittings
Chicago House Wrecking Co.

Blackboards, Slate
Johnson, E. J. & Co.

Blinds
Burlington Venetian Blind Co.
Foster-Munger Co.
Schaller-Hoerr Co.

Blind Hinges
Parker Wire Goods Co.
Stanley Works

Bolts and Nuts
Boston Bolt Co.

Books
Arthur, Wm.
Bradt Publishing Co.
Comstock, Wm. T.
Gem Publishing Co.
Williams, David, Co.

Boring Machines
Fox Machine Co.
Millers Falls Co.

Builders' Hardware
Boston Bolt Co.
Hammacher, Schlemmer & Co.

Building Brackets, Folding
Stanley Works
Tower & Lyon Co.

Building Material
Lestershire Lumber & Box Co.

Building Paper and Felt
Cabot, Samuel.
Standard Paint Co.

Builders' Supplies
Schaller-Hoerr Co.

Butts and Hinges
Stanley Works.

Capitals
Grand Rapids Wood Carving Co.
Waddell Mfg. Co.

Ceiling, Metallic
Berger Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Edwards Mfg. Co.
Eller, J. H. & Co.
Kanneberg Roofing & Ceiling Co.
Keighley, S. Metal Ceiling & Mfg. Co.
Kinnear & Gager Co.
Wheeling Corrugating Co.
Willis Mfg. Co.

Cement
French, S. H. & Co.

Cisterns, Steel
O. K. Harry Steel Works.

Clamps
Batavia Clamp Co.
Cincinnati Tool Co.

Concrete Block Machines, Portable
Ideal Concrete Machinery Co.
Pettyjohn Co.

Conductor Pipes
American Rolling Mill.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.

Conservatories
Burnham, Hitchings, Pierson Co.

Contractors' Supplies
Boston Bolt Co.

Cornices, Sheet Metal
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Edwards Mfg. Co.
Eller, J. H. & Co.
Kanneberg Roofing & Ceiling Co.
Mesker & Bro.
Mullins, W. H. Co.
Willis Mfg. Co.

Cresting
Van Dorn Iron Works Co.
Willis Mfg. Co.

Cutter Heads
Shimer, Sam'l J. & Sons.

Designs and Details
(See House Plans)

Door Checks and Springs
Hammacher, Schlemmer & Co.

Door Hangers
Lane Bros. Co.
National Mfg. Co.

Draw Knives
Wilkinson, A. J. & Co.

Drawing Instruction
International Correspondence Schools.

Drawing Outfits
Comstock, Wm. T.
Rich, J. & G.

Drying Stoves
Drouve, G. Co.

Dumb Walter Fixtures
Hammacher, Schlemmer & Co.

Dynamos
Mietz, A.

Eave Troughs
Chattanooga Roofing & Fdry. Co.
Eller, J. H. & Co.
Wheeling Corrugating Co.

Elevators and Dumb Waiters
Energy Elevator Co.
Kimball Bros. Co.
Sedgwick Machine Works.
Warner Elevator Mfg. Co.

Engines
Mietz, A.

Expansion Bolts
Boston Bolt Co.
Diamond Expansion Bolt Co.

Fencing
O. K. Harry Steel Works.

Files and Rasps
Barnet, G. & H. Co.
Boston Bolt Co:

Framing Tools
Topp, G. A., & Co.

Furnaces and Heaters
Boynton Furnace Co.
Floyd-Wells Co.
Hess Warming & Ventilating Co.
International Heater Co.
Kelsey Heating Co.
Schafer Furnace Co.
Tubular Heating & Ventilating Co.

Gas and Electric Fixtures
Frink, I. P.

Gas Machines
International Heater Co.

Grates, Fancy Plated
Chattanooga Roofing & Fdry. Co.

Greenhouses
Burnham, Hitchings, Pierson Co.

Grille Work, Wood
Foster-Munger Co.
Waddell Mfg. Co.

Grindstones
Cleveland Stone Co.

Grooving Heads
Fox Machine Co.

Hardware Jobbers
White, Van Glahn & Co.

Hardware Specialties
Champion Safety Lock Co.

Hasps, Hooks and Staples
Woodhouse Hdw. Mfg. Co.

Heaters.—*Steam and Hot Water.*
Burnham, Hitchings, Pierson Co.
International Heater Co.

Hinges, Spring
Bommer Bros.

Hoists
Mietz, A.

House Plans
Comstock, Wm. T.

Iron House Fronts
Mesker & Bro.

Iron Work
Van Dorn Iron Works Co.

Lath, Metal
Truss Metal Lath Co.
Wheeling Corrugating Co.

Lavatories
Chicago House Wrecking Co.

Levels
Baker, McMillen Co.
Bostrom-Brady Mfg. Co.
Davis & Cook.
Stetson, R. O.

Lightning Rods
Washburn, E. G. & Co.

Lumber and Shingles
Lestershire Lumber & Box Co.

Mangers, Slow Feed
Broad Gauge Iron Stall Works.

Mantels
Burritt, A. W., Co.
Foster-Munger Co.
French, Sam'l H. & Co.
Lorenzen, C. F. & Co.
Ostendorf, W. H.
Phila. & Boston Face Brick Co.

Marine Engines
Mietz, A.

Masons' Stoves
Drouve, G. Co.

Metal Lath
Truss Metal Lath Co.

Mill Work
Schaller-Hoerr Co.

Mineral Wool
Columbia Mineral Wool Co.
U. S. Mineral Wool Co.

Miter Boxes
Goodell Mfg. Co.
Nicholls Mfg. Co.

Miter Machines
Fox Machine Co.

Miters
Fox, P. L.

Moldings
American Column Co.
Grand Rapids Wood Carving Co.
Schaller-Hoerr Co.
Waddell Mfg. Co.

Mortar Colors
French, Sam'l H. & Co.

Mortisers Hand
Miller, A. W., Mfg. Co.

Ornamental Sheet Metal Work
Mullins, W. H. Co.

Paint
New Jersey Zinc Co.
Standard Paint Co.

Parquette Flooring
Interior Hardwood Co.
Johnson, S. C., & Son.
Wood-Mosaic Flooring Co.

Patent Lawyers
Hamlin, George R.

Pencils
Dixon, Jos. Crucible Co.

Planes
Gage Tool Co.
Smith, Otis A.
Tower & Lyon Co.
Union Mfg. Co.

Plasterers' Corner Plates
New York Steel Corner Plate. Co.

Plastic Ornaments
French, Samuel H. & Co.

Plumbers' Supplies
Karol, B. C.

Porch Columns
American Column Co.
Hartman Bros. Mfg. Co.

Pumps
Mietz, A.

Reflectors
Frink, I. P.

Roofing, Art Metal Tile
Mullins, W. H. Co.

Roofing and Siding
Asphalt Ready Roofing Co.
Berger Mfg. Co.
Canton Steel Roofing Co.
Drouve, G. Co.
Eastern Granite Roofing Co.
Edwards Mfg. Co.
Eller, J. H. & Co.
Kanneberg Roofing & Ceiling Co.
Lincoln Waterproof Cloth Co.
O. K. Harry Steel Works.
Scott & Co.
Standard Paint Co.
Stowell Mfg. Co.
Wheeling Corrugating Co.

Roofing Brackets
Stanley Rule & Level Co.

Roofing Paint
Asphalt Ready Roofing Co.
Dixon, Jos. Crucible Co.

Roofing Slate
Johnson, E. J. & Co.

Sash Balances
Caldwell Mfg. Co.

Sash Chains
Bridgeport Chain Co.
Morton, Thomas.
Smith & Egge Mfg. Co.

Sash Cord
Samson Cordage Works.
Silver Lake Co.

Sash Locks
Champion Safety Lock Co.
Hubbard, D. S., Son & Co.
Ives, H. B. & Co.

Sash Operating Devices
Burnham, Hitchings, Pierson Co.

Sash Pulleys
Grand Rapids Hardware Co.

Sash Weights
Raymond Lead Co.

Sashes, Doors and Blinds
Foster-Munger Co.
Lestershire Lumber & Box Co.

Saw Clamps
Disston, Henry & Sons.

Saw Filing Guide
Disston, Henry & Sons.

Saw Holders
Gayle, T. D.

Saw Jointers
Crescent Machine Co.

Saw Sets
Taintor Mfg. Co.

Saw Tables
Crescent Machine Co.
Kidder, R. E.

Saws
Atkins, E. C. & Co.
Disston, Henry & Sons.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
National Saw Co.
Simonds Mfg. Co.

Schools
American School of Correspondence
International Correspondence Schools.

Screw Drivers
Kraeuter & Co.
North Bros. Mfg. Co.

Sheet Metal Fronts
Mesker & Bro.

Shingles and Tiles, Metallic
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Cortright Metal Roofing Co.
Montross Metal Shingle Co.
National Sheet Metal Roofing Co.
Willis Mfg. Co.

Shingles Hip
Wheeling Corrugating Co.

Shingle Stains
Cabot, Samuel.

Shutter Worker
Mallory Mfg. Co.

Shutters (See Blinds)

Skylights
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Drouve, G. Co.
Edwards Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mullins, W. H. Co.
Willis Mfg. Co.

Speaking Tubes
Ostrander, W. R. & Co.

Spring Hinges
Bommer Bros.

Squares
Duby & Shinn.
Fox, P. L.
Nicholls Mfg. Co.

Steel Figures and Letters
Sackman, F. A.

Steel Square Key
Woods, Alfred W.

Stoves and Ranges
Boynton Furnace Co.

Structural Iron and Steel Works
Boston Bolt Co.

Structural Slate
Johnson, E. J. & Co.

Tanks, Steel
O. K. Harry Steel Works.

Tiling
Ostendorf, W. H.
Star Encaustic Tile Co.

Tool Boxes
Walter's Sons, W. P.

Tool Cabinets
Hammacher, Schlemmer & Co

Tool Chests
Jennings, C. E. Co.

Tools
Forest City Bit & Tool Co.
Gage Tool Co.
Hammacher, Schlemmer & Co
Jennings, C. E. Co.
Kraeuter & Co.
Millers Falls Co.
North Bros. Mfg. Co.
Progressive Mfg. Co.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S., Co.
Strelinger, C. A., Co.
Tower & Lyon Co.
Walter's Sons, Wm. P.
Wilkinson, A. J., & Co.

Turned, Molded Carved Work
Waddell Mfg. Co.

Ventilating Attachment
Drouve, G., Co.

Ventilators
Globe Ventilator Co.

Veranda Stock
American Column Co.

Vises
Hammacher, Schlemmer & Co

Wagon Jacks
Batavia Clamp Co.

Water Closets
Chicago House Wrecking Co

Wax, Finishing and Polishing
Johnson, S. C., & Son.

Weather Strips
Hammacher, Schlemmer & Co
King Mfg. Co.

Weather Vanes
Broad Gauge Iron Stall Works.

Window Apparatus
Drouve, G. Co.

Window and Door Stops
King Mfg. Co.

Window Fasteners
Stanley Works.

Window Stop Adjusters
Ives, Hobart B., & Co.

Window Trimmings
Caldwell Mfg. Co.

Windows, Fireproof
Mullins, W. H. Co.

Wood Carving
Grand Rapids Wood Carving Co.

Wood Mantels
(See Mantels)

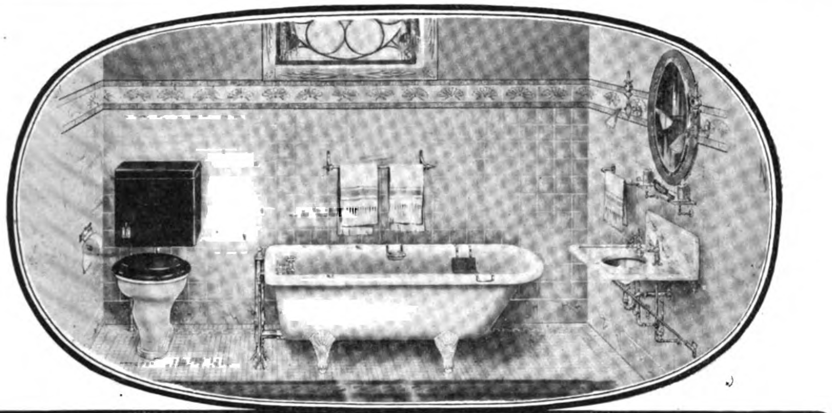
Wood Ornaments
Waddell Mfg. Co.

Wood Trimmers
Fox Machine Co.

Wood Working
Lestershire Lumber & Box Co.

Wood Working Machinery
American Wood Working Mach'y Co.
Barnes, W. F. & John.
Barnes Tool Co.
Cordesman Machine Co.
Fay, J. A. & Egan Co.
Fox Machine Co.
Kidder, R. E.
Long Island Machinery Co.
Marston, J. M. & Co.
Parks Ball Bearing Machinery Co.
Seneca Falls Mfg. Co.

Wood Working Machinery, Second Hand
Long Island Machinery Co.



This Bath Room Outfit $55.00

CLEAN—SANITARY—ODORLESS—NEWEST DESIGNS—BEST APPLIANCES—FINEST NICKEL TRIMMINGS

THE BATH TUB Seamless cast iron, heavy 3-inch roll rim, 5 feet in length and 30 inches in width, finest white porcelain enameled on the inside and over the roll rim. The fittings are extra heavy brass nickel-plated, consisting of Outside Standing "Roman" waste with china index button; Fuller double bath cock; off-set supply pipes; with floor flanges.

THE LAVATORY Countersunk genuine marble slab; solid porcelain 14x17 inch Patent overflow oval basin; nickel-plated brass rope pattern brackets; nickel-plated brass Fuller basin cocks; nickel-plated brass supply pipes; with air chambers; nickel-plated brass trap (both trap and supply pipes to the wall); nickel-plated chain and rubber stopper; basin clamps, screws; and nickel-plated flanges.

THE CLOSET Low tank pattern, thoroughly sanitary and modern in construction; latest improved Vitreous syphon wash-down bowl; seat and cover made of seasoned quarter-sawed Oak with high polished finish; seat attaches directly to the bowl with post and nickel-plated hinges; tank is lined with heavy copper and includes a high pressure ball cock and float valve syphon, and has nickel-plated push button action; two-inch elbow connection between the tank and the bowl, and nickel-plated supply pipe from floor to the tank.

QUALITY We guarantee every article used in this Bath Room outfit to be new and perfect. The enamel ware is guaranteed for two years against crazes, chips or defects from ordinary wear. Any article proven defective within this time will be cheerfully replaced with perfect material. The outfit will be furnished with floor screws, flanges, clamps, etc., complete and ready to set up.

Connections easily made. Any ordinary mechanic can install with the aid of our comprehensive working plans and instructions. **Satisfaction Guaranteed or Money Refunded.**

PRICE, as Described, $55.00

We will furnish the additional trimmings—paper holder—two towel bars—glass shelf—bath seat and soap cup, for $7.00.

Other Bath Room Outfits from $25.00 to $125.00

WRITE US Anyone interested in Plumbing Material or Heating Apparatus of any kind, will do well to write to us before buying elsewhere, as we have the largest and finest selection in the world, and can save purchaser considerable money—all fully guaranteed.

All the material used in this outfit is absolutely brand new.

We Can Save You 30 to 50 per cent. on Your Lumber Bills

We are engaged in dismantling the Fifty Million Dollar St. Louis World's Fair. We purchased this greatest of Expositions outright and offer you a wonderful opportunity to save at least 30 per cent. on your purchase in this line. Better lumber than that which we are offering does not grow. Its year of service has only tended to increase its value. It is thoroughly seasoned. We must sell this lumber at once.

SEND US YOUR LUMBER BILLS FOR OUR ESTIMATE

On application we will quote you prices Freight Prepaid to your nearest Shipping Point.

Now is your opportunity to put into execution your long contemplated improvements. We have lumber for every purpose; for Building Houses, Barns, Cribs, Farm Buildings, Fences, etc., etc.

10,000 good Doors, $1.00, Also Fancy Doors from $1.50 to $4.00. Sash for every purpose. 2,000 Greenhouses Sash, 3 x 6 inches, glazed, at $1.65.

We have an Office on the Exposition Grounds at St. Louis. Visitors are cordially invited to visit our Headquarters at that point.
Quick delivery if you order at once. Special low prices are made for lumber for delivery within the next 30 days.
We can furnish Studding, Joists, Planking, Dressed and Matched Flooring, Sheathing, Timbers, in fact, lumber for any purpose.

STEEL ROOFING $1.75 PER 100 SQ. FEET

Painted red both sides, most durable and economical roofing, siding or ceiling for barns, sheds, houses, stores, cribs, poultry houses, etc. Easier to lay and cheaper than any other material. No experience necessary to lay it. A hammer or hatchet are the only tools you need.

WE PAY THE FREIGHT

to all points east of Colorado, except Colorado, Oklahoma, Texas and Indian Territory. This is our No. 15, semi-hardened, **flat steel roofing,** 24 x 24 inches, per square of 100 square feet..$1.75

Corrugated V Crimped or standing seam, per square 1.85

For 25c. per square more we furnish this material in 6 and 8 ft. lengths.

Brick siding and beaded ceiling or siding, per 100 square feet.........$2.25

"EAGLE" FELT ROOFING 60 CENTS PER 108 SQUARE FEET

Two-ply "Eagle" Brand Roofing without Supplies, per square	60c
Three-ply "Eagle" Brand Roofing without Supplies, per square	90c
Vulcanite Roofing, with nails, caps and cement; does not require coating, per square	$1.75

Galvanized Rubber Roofing, the finest ready roofing manufactured, good enough for any kind of Building, also useful and practical for lining purposes. Nails, caps and cement furnished. Does not require coating after it is on the roof. Three grades, **$1.50, $1.90** and **$2.15** per square. Samples furnished free.

Galvanized Iron Conductor Pipe, size 3 in, per 10 ft. length	42c
Galvanized Iron Eave Trough, size 3½ in., per 10 ft. length	31c
Galvanized Iron Elbows, 3 inch, each	14c
Eave Trough Corners, each	18c
Eave Trough Hangers, per dozen	24c
Galvanized Ridge Roll, 2 inch roll, per foot	4¾c

THOUSANDS OF OTHER ITEMS

Hardware, Iron Pipe, Heating Apparatus, Paints, Tools, Pumps, Tanks, Boilers and Engines, Dynamos, Electrical Apparatus Fire Hose, Fencing, Wire, Safes, Vault Doors, etc., etc.

Ask for Catalog No. 608

Chicago House Wrecking Co.

35th and Iron Sts., Chicago

American Saw Benches

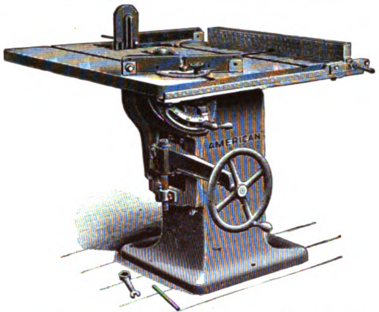


Fig. 637. Clement No. 1 Variety Saw Bench.

FOR ALL
CLASSES
OF WORK

WRITE US REGARDING THEM

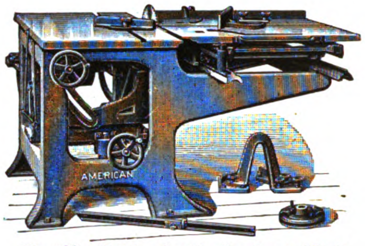


Fig. 622. Houston Combination Saw and Dado Machine.

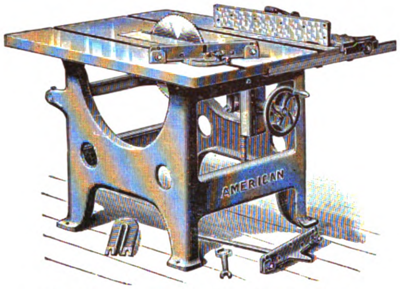


Fig. 623. Clement No. 2 Combination Saw.

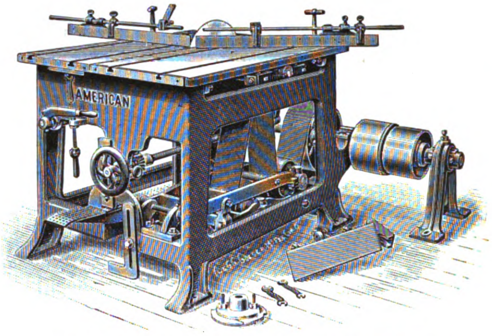


Fig. 617. No. 7½ Combination Saw and Dado Machine.

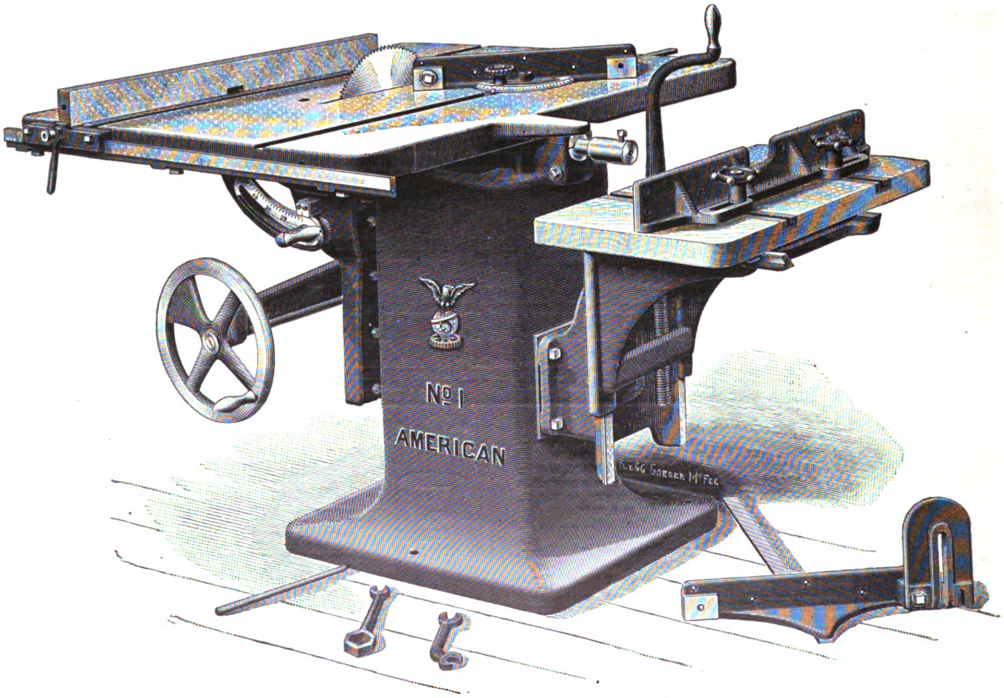


Fig. 633.—Clement No. 1 Variety Saw Bench with Boring Attachment.

American Wood Working Machinery Co.

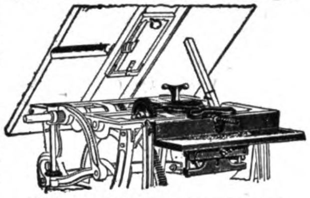
New Orleans Chicago New York

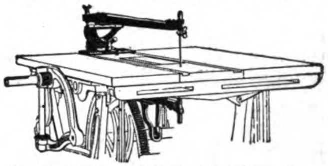
No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw

(Almost a Complete Workshop in One Machine.)

THIS Machine is suitable for various kinds of work—ripping (up to 3½" thick), cross-cutting, mitering, rabbetting, grooving, dadoing, etc., and with the additions of extra attachments, boring, scroll-sawing, edge moulding, beading, etc. The heaviest, most substantial, accurate and easiest running machine of its kind on the market.


"Union" Moulding Attachment.


"Union" Boring Attachment.

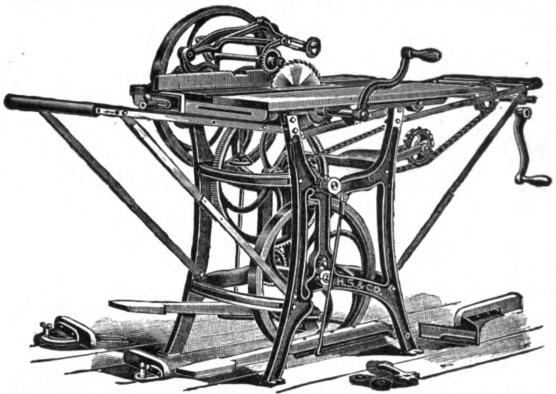

"Union" Scroll Saw Attachment.

ADVANTAGES: Large adjustable combination wood and iron table, 28 x 36"; folding extension rolls for long work; two hand powers, one for self-feed ripping and the other for cross-cutting, etc., arranged at rear of machine, leaving table free and allowing operator a natural, upright and easy position; our patent foot-power with walking motion; three changes of speed, three changes of feed, no lost motion, power being transmitted entirely by chain belt and accurate machine cut gears, steel shafts and babbitt metal lined boxes, adjustable for wear; easy and quick to change machine from one operation to another.

WE BUILD a complete line of Foot, Hand and Light Power Wood Working Machinery, and guarantee each machine to be thoroughly practical and accurate.

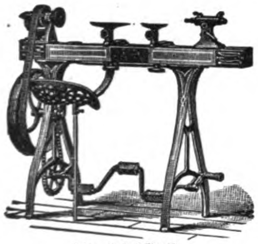
Machines sent on trial and if not found entirely satisfactory may be returned at our expense.

Send for Catalog A.


No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw.

The Seneca Falls Mfg. Co.
209 Water St.,
SENECA FALLS, N. Y., U.S.A. 91-H.

HAND POWER FOOT WOOD-WORKING MACHINERY.


No. 3 LATHE.

A Complete Line for a Carpenter and Builder.


Tenoner.

Our Machines are so constructed that you can take them to the house you are building.

. . . Saves Time


No. 2 SCROLL SAW.


No. 7 SCROLL SAW.

Any of our machines will pay for themselves in a year and often in a single job.

Why buy these Machines? BECAUSE

You can save a mill man's profit.
You can make more money with less capital invested.
You can manufacture in as good style and finish, and at lower cost than the mill.
You can work up stuff ahead in winter for the spring rush in building.
10,000 builders are using from one to eight of our different machines.

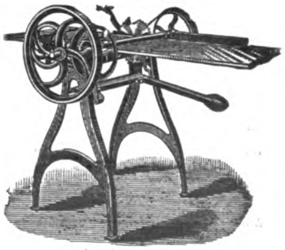
Our machines are not complicated, but simple, strong, practical and built for good hard work.


FORMER.


No. 4 SAW.


MORTISER

Send for Catalogue and Prices.

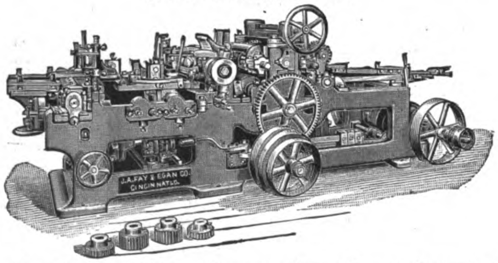

HAND RIP SAW.

W. F. & JOHN BARNES CO., 71 RUBY ST. ROCKFORD ILL.

ARE YOU THINKING OF GETTING

Wood-working Machines? That's all we make—been making it 75 years, for the four corners of the world. It will pay you to investigate them.

Ever interested in motor-driven tools? They're slowly but *surely* coming. We're furnishing them right along.



No. 133 new Four Side Inside Molder, 12 or 15 by 6 inches. For light or heavy work. Replete with labor-saving devices, and has all the latest improvements.

We make a complete line of inside and outside molders—smallest to largest sizes—each having Fay & Egan quality—a guarantee for merit.

J. A. FAY & EGAN CO.

221-241 W. Front St.
CINCINNATI, O.

Catalogue, books on band saws, sanders or universal wood-workers, free.

LARGEST BUILDERS OF WOOD-WORKING MACHINERY IN THE WORLD

CORRUGATED IRON
Painted and Galvanized.

SCOTT & CO.,
Cincinnati, O.

Agents Wanted

IRON ROOFING
Painted and Galvanized.

OPPORTUNITY . .
Makes the Man.

Therefore grasp this opportunity NOW, that will take you to the highway of success by using the A. B. C. SCHEDULES, or ITEMIZED BLANK ESTIMATING FORMS for the use of

CONTRACTORS AND BUILDERS

These Schedules are superior to anything of the kind already offered for sale. Not a text book on estimating, or a series of tables, but just a series of simple, common sense Blank Forms, giving a complete list of all items entering into the construction of a building.

It will pay you to investigate this.

There is a separate and complete schedule for each of the following trades:—CARPENTERS, MASONS, PLUMBERS, PAINTERS.

A sample copy of Schedule covering any of these trades for 25c. A complete book (one of each series) ONE DOLLAR.

THE GEM PUBLISHING CO.,
P. O. Box No. 14. BROOKLYN, NEW YORK.

PLUMBERS' SUPPLIES
AT WHOLESALE.

If you need anything in my line, and wish to **SAVE 20 to 40 Per Cent** on every article, write for my free illustrated Catalog. Shipments promptly made from a very complete stock of guaranteed goods. Small orders are as carefully handled as large ones.

B. C. KAROL, 235 W. Harrison St., Chicago, Ill.

MARK YOUR TOOLS WITH A STEEL STAMP.

SEND FOR PRICE-LIST No. 7

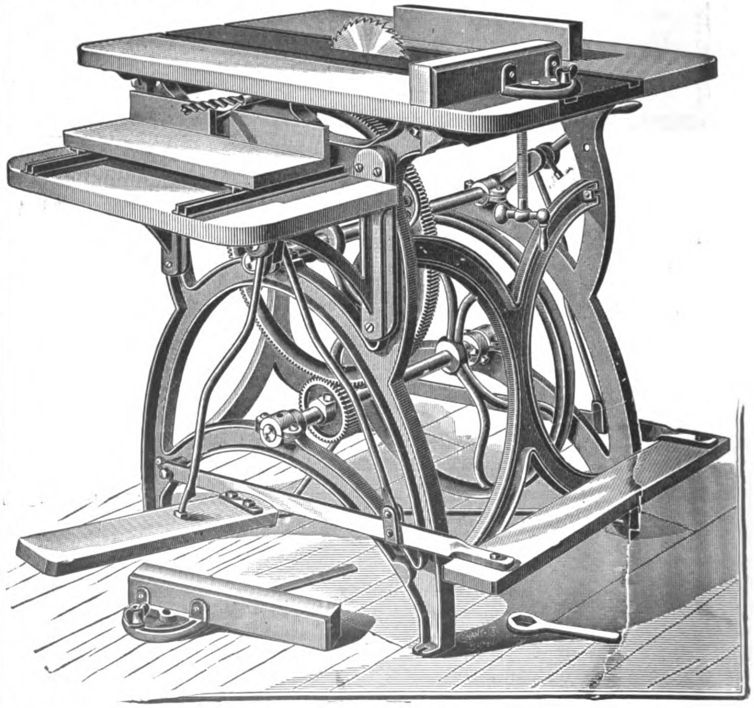
CONTRACTORS

Young men desiring to fit themselves for Contractors should fill out and send this advertisement to us to-day and receive our 200 page handbook (FREE) describing our Contractors' and Builders' course and over 60 others, including Architecture, Electrical, Mechanical and Civil Engineering, Heating, Ventilation and Plumbing, Architectural Drafting, Mechanical Drawing, Telephony, Telegraphy Textiles, etc.

American School of Correspondence
Chicago, Ill

Name ....
Address..
City and State..
C. & B. 2-0

Marston's Hand and Foot Power Circular Saw.



Iron frame, 36 inches high.
Center part of top is made of iron accurately planed, with grooves on each side of saw for gauges to slide in.
Steel shafts and best babbitt metal boxes.
Gears are all machine-cut from solid iron.
Boring table and side treadle.
Two 7-inch saws and two crank handles with each machine.
Weight complete, 350 pounds.
Send for catalogue.

J. M. MARSTON & CO., 201 Ruggles St., Boston, Mass.

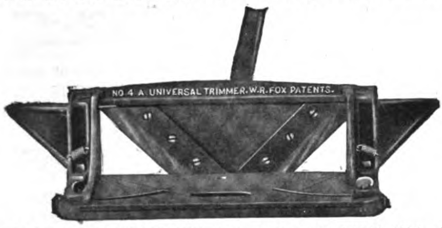
OUR descriptive catalogue of Building Trades Books will interest every progressive Carpenter and Builder.

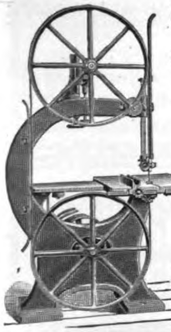
DAVID WILLIAMS CO., 14 16 Park Place, N. Y.

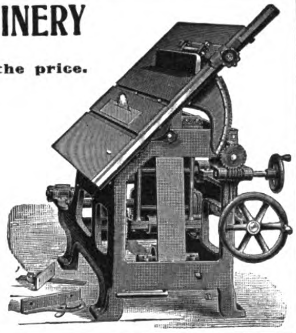
Digitized by Google

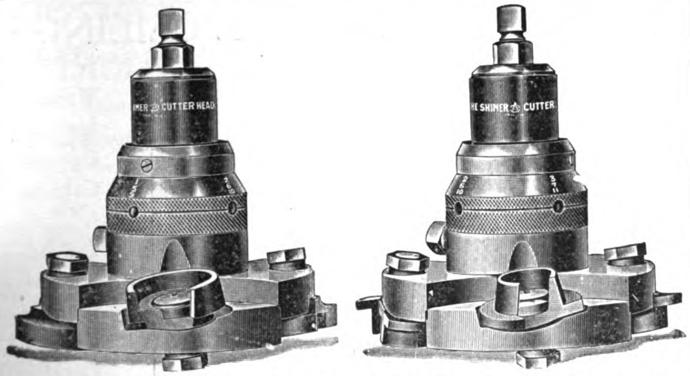
Original from
UNIVERSITY OF MICHIGAN

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google


NO 4 A UNIVERSAL TRIMMER W. R. FOX PATENTS.



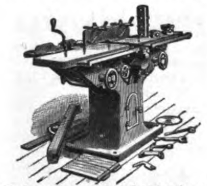



MER CUTTER HEAD
HE SHIMER CUTTER


DIAMOND
EXPANSION SHIELD

CORDESMAN, MEYER & CO., 26, 28 and 30 Central Avenue,

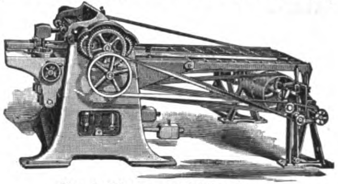
CINCINNATI, OHIO.


Universal Wood-Worker.

Finest Grades of Latest Improved

Wood-Working Machinery

For Planing Mills, Furniture and Chair Factories, Carriage, Wagon and Agricultural Works. Circulars and prices. Correspondence solicited.


No. 2 Planer and Matcher.

Ball Bearing

MACHINERY.

Great improvement for foot power, Rip Saw, Band Saw and Boring. All ready for use, same for power. Other attachments and useful tools.

Manufactured by

PARKS
Ball Bearing Mach. Co.
Sta. A.,
Cincinnati, Ohio

DO YOU WANT THE BEST

DRAWING TABLE

made? If so send for illustrated catalogue and prices.

R. E. KIDDER,
22 Hermon Street, Worcester, Mass.

SECOND-HAND WOOD WORKING MACHINERY

Woods Moulder 12 in. Matchers 24 in.
Berlin Moulder 15 in. Pony Planers 16, 20, 24 in.
Rogers Moulder 8 in.

Variety Machines, Double and Single, Jointers, Swing Saws, Rolling Top Saw Tables, Gas and Gasoline Engines, Band Saws, Routers, Sanders, Circular Saws, Jig Saws.

A1 CONDITION. PROMPT DELIVERY.

All Kinds of Machinery Purchased for Cash.

LONG ISLAND MACHINERY CO.
15 Washington Ave., Brooklyn, N. Y.

"STAR ENCAUSTIC TILE CO.,"

MANUFACTURERS OF

Superior Unglazed Encaustic Tile

For Floors in Stores, Churches, Depots, Kitchens, Halls, Porches, &c.

Office and Factory, Bluff Street, near Gist,
PITTSBURG, PA.

Three Times the Service

on either house or barn MONTROSS METAL SHINGLE-ROOFING outlasts all other methods. Fire-proof, easily applied. *Catalog, testimonials and prices free.*

Montross Metal Shingle Co., CAMDEN, N. J.

Its application is very simple— no experienced help is needed. With every roll are included nails, tin caps and cement sufficient for the work. **RUBEROID** is so pliable that it fits anywhere.

THE well-told truth has for 13 years drawn builders' attention to **RUBEROID ROOFING** — demonstration of this truth has made its believers legion. **RUBEROID ROOFING** does all claimed for it. It *is* water and weather-proof. Its resistance to acids, gases, great heat and even fire is extraordinary. It will *not* melt, rot or crack. But "above all things" avoid imitations. Look for the registered trade mark **"RUBEROID"** always stamped on the under side. Send for samples.

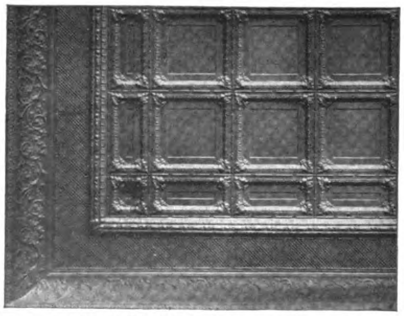
MANUFACTURED SOLELY BY

THE STANDARD PAINT CO.,
100 William St., New York.
CHICAGO OFFICES: 188-90 Madison St.

THE EDWARDS METAL CEILINGS

FIRE-PROOF, DURABLE, DUST PROOF, ARTISTIC, SANITARY

Cornices, Skylights, Corrugated Iron, Metal Shingles, Steel Roofing, Siding, Etc.



Write for General Catalog L and Special Metal Ceiling Catalog

THE EDWARDS MANUFACTURING CO.
EGGLESTON AVE. "The Sheet Metal Folks" CINCINNATI, OHIO.
NEW YORK OFFICE, 52 Broadway.

We make Ceilings for churches, schools, stores, lodge rooms, court rooms, libraries, residences, etc.

Our ceilings are shipped ready for erection. No expert labor required. Working drawings furnished. They're adapted to any kind of building. Exclusive in classified design.

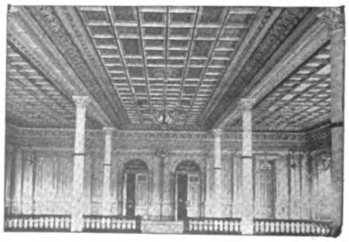
Berger "CLASSIK"

Steel Ceilings

We also make Steel Roofing, Siding, Metal Shingles, Architectural Sheet Metal Work and Fireproofing Material.

Our catalogues sent you free. Ask for them.

THE BERGER MFG. CO.
CANTON, OHIO.
New York. Boston. Phila. St. Louis



"AMERICAN"

Polygon Conductor Pipe

Can be furnished in either Galvanized Iron or Copper. It is made from galvanized iron in 10-ft. lengths, without a cross seam; from copper in 8-ft. lengths.

American Rolling Mill Co., MIDDLETOWN, OHIO.

Portable Hollow Concrete Block Machine

BEST—FASTEST—SIMPLEST—CHEAPEST.

MOVE THE MACHINE—NOT THE BLOCKS

Saves labor of off-bearing, avoids loss by crackage or breakage, saves expense of heavy cumbersome iron pallets. Sand, Water and Portland Cement only materials required. BIG PROFITS. Blocks cost 6 cents to make. Sell for 18 cents. Whole outfit costs $125.00.

FULLY GUARANTEED. SENT ON TRIAL.

THE PETTYJOHN CO., 616 North 6th Street,
TERRE HAUTE, IND.

Simplicity, Rapidity Adaptability, Durability

ARE THE FOUR CARDINAL POINTS

Combined in

NO Wheels, Chains, Cogs, Gears or Cranks. Nothing to Clog, Break or get out of order. No loss of time or labor.

The Ideal Hollow Concrete Block Machine

"The Peer of All"

Manufactured by

Ideal Concrete Machinery Co.

Formerly Aurburn, Ind. **South Bend, Ind.**

Handsome Catalog and Booklet for the asking.

Face formed on bottom of the mould. Cores withdrawn horizontally by lever—not by hand. **Guaranteed** capacity, two men, 10 hours, 200 blocks. A portable machine that can be carried with ease by two men. Over 200 in use in the State of Indiana alone. The only machine with which can be accomplished the facing of blocks by the Borst system A business proposition to the maker of blocks. An appeal to the common sense judgment of the builder.

In corresponding with us we make our business your interests.

SECURE

PROTECTION AND LONG SERVICE BY USING OUR

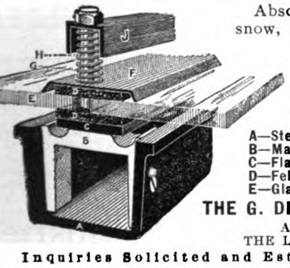
ASPHALT ROOFING

SAVES REPAIRS
SAVES RECOATING
SAVES RENEWING

Send for Samples and Pamphlet

STOWELL MFG. CO.
JERSEY CITY, N.J.

THE "ANTI-PLUVIUS" SKYLIGHT



Absolutely and permanently impervious to rain, snow, sleet or dust without putty or cement. With bridge arrangement for walking on the skylight without danger of breaking the glass. Specially adapted for large buildings and shops where there is always more or less vibration.

A—Steel Supporting Bar.
B—Mall. Iron Bridge.
C—Flat Iron.
D—Felt.
E—Glass.
F—Copper Sheet Cap.
G—Coil Galv. Brass Spring.
H—Galv. Brass Stud.
J—Bridge (for walking on skylight).

THE G. DROUVÉ CO., Bridgeport, Conn., U. S. A.

Also Manufacturers and Erectors of
THE LOVELL WINDOW OPERATING DEVICE.

Inquiries Solicited and Estimates Cheerfully Furnished.

GRINDSTONES.

Mounted Grindstones for Carpenters' or Anybody's Use.

THE CLEVELAND STONE CO.,
6th Floor, Hickox Bldg., CLEVELAND, O.

WE CARRY FULL STOCK IN
ALL OUR WAREHOUSES.

BRANCH OFFICES and WAREHOUSES:

New York City	47 Cliff Street
Chicago	45 Lake Street
St. Louis	112 So. Eighth Street
Philadelphia	402 Race Street
Boston, Mass.	132 Pearl Street
Chattanooga, Tenn.	King Street

SAMPLE POSTPAID ON
REQUEST.

W.C.CO.'S
I C
WHITAKER
I C
REDIPPED
—STAMPED—

—SPECIFY—

WHITAKER OLD STYLE ROOFING PLATES

The Whitaker Old Style Redipped is made by the Palm Oil Process from perfect, carefully annealed black plate, and carries 47 pounds coating of pure tin and new lead to the 20 x 28 box, weighs net—IC 253 pounds; IX 312 pounds. Every sheet is resquared, inspected and packed with our guarantee. THERE CAN BE NO BETTER ROOFING PLATE MADE.

MANUFACTURED BY
WHEELING CORRUGATING COMPANY,
WHEELING, WEST VIRGINIA.

HICKS' BUILDERS' GUIDE

18th THOUSAND

A testimonial of the Guide, more expressive than any we could offer, is the sale, which is now in the eighteenth thousand. The book sells because it is wanted and is wanted because it is known to be one of the most practical, convenient and useful of the handbooks for the young carpenter and builder. The Guide was designed by a man who understood their needs and the knotty problems of the daily work are solved in the simplest and best ways.

Especially full on the methods of framing and estimating the cost of labor and material

A GLANCE AT THE CONTENTS:

Points on Estimating.
A practical review of measures, items and quantities, with lists of material.

Geometrical Measurements of Roofs.
Explaining the accurate method of measuring various shaped roofs.—Illustrated.

Hip and Valley Roofs.
Another section on figuring roof area. Clearly explained and illustrated.

Estimating Labor for Carpentry Work.
The author's simple and reliable method of finding figures and quantities in this comparatively difficult phase of estimating—with lists of items and prices.

Short Cut in Estimating.
A short method of figuring the bulk of rough work, including framing, raising, sheeting siding, roofing, laying of floors, setting partitions, &c.

Practical Methods of Construction.
Bringing out a few points on carpentry which are often neglected or overlooked.—Illustrated.

Binding Sliding Doors.
A frequently needed remedy.—Illustrated.

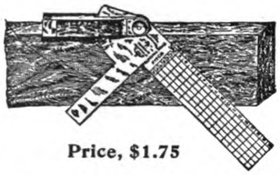
Art of Roof Framing.
A very complete treatment extending from pages 87 to 150. Begins with the simplest form of roof and goes step by step through roof framing of all descriptions.—50 illustrations.

Mitering Planceers, Mouldings, Etc.
Illustrates and describes the making of joints, which many workmen find troublesome.

166 Pages. 114 Illustrations. One Dollar, Postpaid.

DAVID WILLIAMS COMPANY, Publishers,
14-16 PARK PLACE, NEW YORK.

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google



Price, $1.75

TOPP'S FRAMING TOOL.

A PERFECT TOOL and the only Tool for the purpose ever invented.

Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

Write for booklet. Address the manufacturers,

G. A. TOPP & CO., - Indianapolis, Ind.

"WHAT WILL IT COST TO PATENT MY INVENTION?"

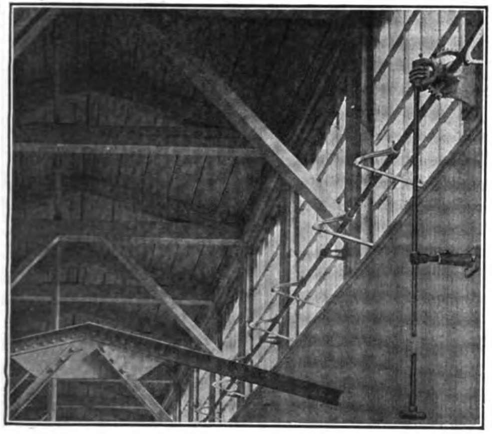
Is answered to your entire satisfaction in my booklet "ABOUT PROTECTING INVENTIONS IN THE UNITED STATES." This booklet also tells about the origin and growth of the patent system, states who can become a patentee, how to find out if your invention can be patented, how to patent your invention, and how to obtain a strong and comprehensive patent which will make for the success of your invention. I will send the booklet to anyone.

GEO. R. HAMLIN, Patent Attorney,

References on request.

No. 800 H. Street, N. W., Washington, D. C.

Ventilating Tasks.



Our Sash Operating Apparatus shifts one sash or 100 of them—with perfect ease. Total absence of chains, cables, springs or complicated system of levers or sliding gears.

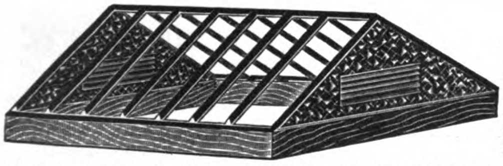
Can be operated from any desired location. R. H. Macy's store, Otis Elevator Factory and hundreds of others use our devices.

Send for Catalog X-V

BURNHAM-HITCHINGS-PIERSON CO.

1133 Broadway, cor. 26th St., New York.

Boston Branch: 819 Tremont Building.



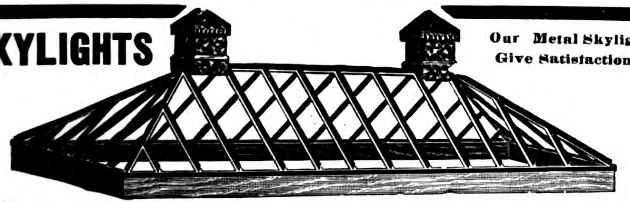
ART METAL CEILINGS

Exclusive and Artistic Designs appropriate for any style of architecture.

All Styles Galvanized and Copper Skylights, Cornices, Finials, Crestings, Ventilators, Metal Shingles, Roof Gutters, all styles painted and galvanized Iron Roofing and Siding, etc. Write for Catalogue and Prices. Estimates free.

Kanneberg Roofing & Ceiling Co.,
Manufacturers,
CANTON, OHIO.

SKYLIGHTS



Our Metal Skylights Give Satisfaction.

They are so constructed that all condensation is carried to the curb and discharged through weep holes on to the roof without soaking between laps.

The peculiar construction of the curb on our skylights renders counterflashing unnecessary.

Frames of galvanized iron or copper, with glass of any kind or thickness.

Write for our New Cornice, Skylight and Ornament Catalog.

THE CANTON STEEL ROOFING CO., Canton, Ohio

The Successful Builder

Conducts his business on systematic principles.

He requires a safe, simple, practical, accurate, and at the same time rapid method for estimating cost of labor and material.

A prominent builder has perfected such a method, based on actual experience, not theory.

We have compiled same in book form and are selling it at the low price of 50c.

Invaluable for repair work, which is the most difficult kind of estimating.

The phenomenal run of this work has nearly exhausted the second edition.

A $2,000 residence estimated in 30 minutes.

DON'T DELAY

Bradt Pub. Co **260 Michigan Ave. JACKSON, MICH.**

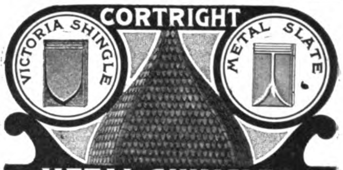
ARCHITECTS

Young men desiring to fit themselves for paying positions in Architects' offices should fill out and send this advertisement to us to-day and receive our 200 page handbook (FREE) describing our Architectural course and over 60 others, including Architectural Engineering, Electrical, Mechanical and Steam Engineering, Heating, Ventilation and Plumbing, Architectural Drafting, Mechanical Drawing, Telephony, Telegraphy, Textiles, etc.

American School of Correspondence
Chicago, Ill.

Name..
Address..
City and State...

C. & B. 2-06



METAL SHINGLES

CARPENTERS:

Do you know the only difference to you in laying Cortright Shingles and wood shingles is that you make more money on the former? Let us explain.

CORTRIGHT METAL ROOFING CO.,
Philadelphia. Chicago.

¶ Have you a copy of that useful book

Hicks' Builders' Guide

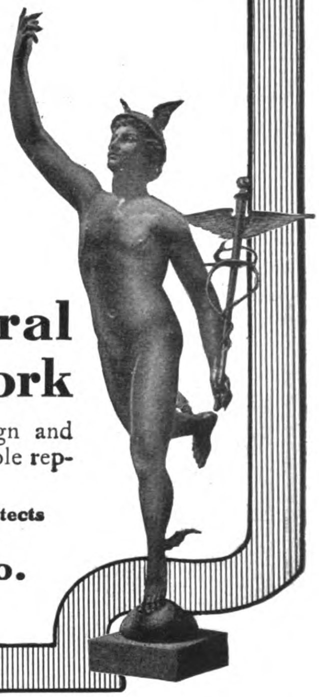
?

¶ Something about it on the opposite page.

DAVID WILLIAMS CO.
Publishers
14-16 Park Place - New York

We Give Particular Attention To Special Designs

and are fully equipped to execute the most intricate and delicate work ever attempted in sheet metal.



Mullins

Art Architectural Sheet Metal Work

is far in advance in architectural design and artistic execution and has won an enviable reputation for excellence.

Estimates, Designs, etc., submitted to architects builders and contractors on request.

The W. H. Mullins Co.
208 Franklin St., Salem, Ohio.
(Everything in sheet metal.)

Better Cisterns—Why?

To protect the health of every member of your family. Medical experts have pronounced the brick and wood cistern to be the cause of many cases of sickness.

A Cistern to be perfectly sanitary must be made so tight that no impurities can possibly get through. This can only be accomplished by using the steel cistern.

O. K. Harry Steel Works,
2341 Papin St., St. Louis, Mo.

ARCHITECTS
CONTRACTORS
BUILDERS

When you want any Structural Work it will pay you to write to the

BOSTON BOLT COMPANY
ESTABLISHED 1872

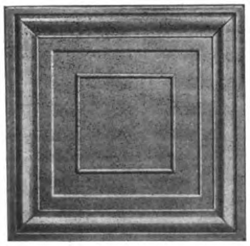
CONVERTORS OF

Iron and **Steel** into all kinds of shapes and dealers in

Contractors' Supplies

Send for our latest Catalog.

284 Franklin St., - Boston, Mass.
JOHN W. CROOKS, Treasurer.



LOCK-JOINT METAL CEILINGS

Absolutely Dust Proof. Easily Erected. Artistic Designs.

——*Ask for Catalogue "D"*——

S. KEIGHLEY METAL CEILING & MFG. CO.
PITTSBURG, PA.

PRODUCERS OF

ROOFING SLATE

SLATE BLACKBOARDS.

E. J. JOHNSON & CO
38 Park Row,
New York.
Quotations delivered anywhere.
Slaters' Supplies,
Snow Guards.
Write for Price Book.

TOP IT OFF WITH **The Willis Cresting Tiles No. 59** and make a perfect and handsome roof. They are made of Tin, painted, Galvanized Steel, Copper and Coppered Steel, and suitable for either slate or shingle roofs.

Send for miniature samples and our Catalogue No. 5, showing a very complete line of cornices, crestings, finials, skylights, and stamped ornaments in zinc, and STEEL CEILINGS, etc.

WILLIS MFG. CO., Galesburg, Ill.
Makers of the Willis Hip Shingles.

Importance of Safe Roof Trusses.

Mistakes in designing and figuring wooden beams and trusses are often of a serious nature.

The *Engineering News* in reviewing the new book,

"Strength of Beams, Floors and Roofs,"

by F. E. Kidder, has this, among other things, to say:

> "This book calls attention to a number of wooden roofs that are shocking in their disregard of structural principles. Some of these roofs were actually built before better advice made itself felt. It is unfortunately true, however, that worse examples may be found. The matter in the present book is valuable (not least) as a contribution to public safety."

With respect to the character and scope of this treatise the review further says:

> "The title might be put: *How to Design and Figure Wooden Beams and Trusses; For the Practical Builder,* as this would characterize the contents fairly well.

: : : : : :

A book the progressive Builder, Carpenter and young Architect will not fail to have.

: : : : : :

222 pages and 164 engravings from original drawings. : : : : : :

$2.00, Prepaid.

DAVID WILLIAMS CO., Publishers.
14-16 Park Place, New York.

GET OUR PRICES ON

METAL CEILINGS,

TIN PLATE,

EAVES-TROUGH, CONDUCTOR PIPE,

CHARCOAL IRON TIN,

CORNICE, SKYLIGHTS, FINIALS, ETC.,

BEFORE BUYING.

J. H. ELLER & CO., . Canton, O.

Combines durability, low price, ease of application, fireproof qualities and sightliness, just what the buyer of roofing material demands.

The cheapest way to repair old shingle roofs is to cover with **PERFECTED GRANITE ROOFING.**

SEND FOR PHOTO PAMPHLET.

Eastern Granite Roofing Co., Irving Building, New York.

THE KINNEAR

STEEL CEILING

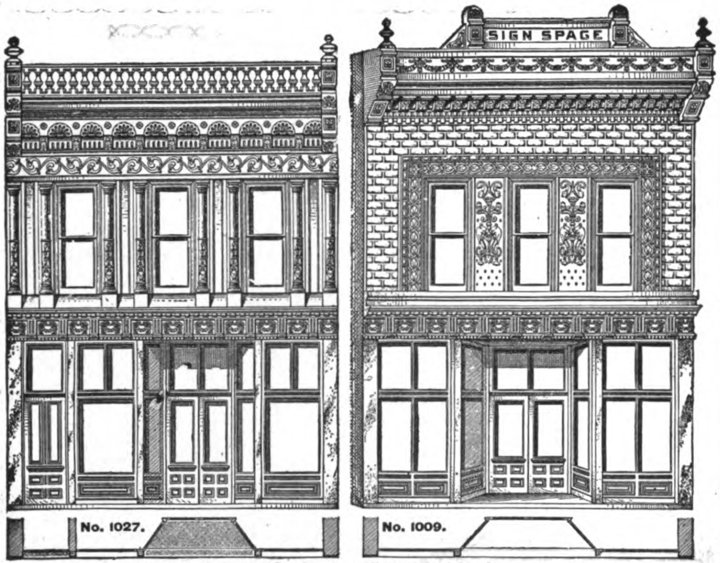
LOCK JOINT

INTERLOCKING JOINT
QUADRUPLE LOCK JOINT } *Patented*

PERFECT CONSTRUCTION.

Send your specifications and plans to us for estimate
Catalogue or Booklet furnished upon request.
Prompt service guaranteed.

THE KINNEAR & GAGER COMPANY,
Manufacturers
COLUMBUS, OHIO
New York, 726 Lexington Ave.
Boston, 125 Broad St.


SIGN SPACE
No. 1027.
No. 1009.

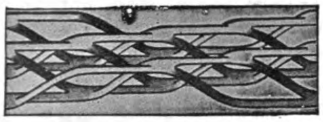

Shingles that last

$105 FOR STORE ELEVATOR

COMPLETE, READY TO ERECT, MADE BY THE HUNDRED. SIMPLE IN CONSTRUCTION. EASILY CARED FOR. OTHER STYLES AND PRICES TO SUIT. (ELECTRIC)

The Warner Elevator Mfg. Co., 2100 Valley St., CINCINNATI, O.
New York Office, 2032 Park Row Bldg.

$105



Kuhne's Truss Metal Lath and Structural Element

Steel Concrete

Best Concrete Binder, Self-centering—For General Fire-Proof Constructions, such as Partitions, Floors, Stairs, Outside Walls, Roofs, Sidewalks, Sewers, Tanks, etc. Patented January 1, 1901.

(CATALOGUES ON APPLICATION.)

TRUSS METAL LATH CO., 15-25 Whitehall St., New York City
MANUFACTURING AND SALES DEPARTMENT:
GOFF, HORNER & CO., LIMITED, Frick Building, Pittsburgh, Pa.
MILLS AT ZANESVILLE, OHIO.

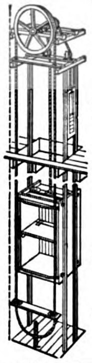
Dexter Portland Cement.

HIGHEST STANDARD ATTAINABLE FOR PAVEMENT AND CONCRETE WORK.

DEXTER PORTLAND CEMENT CO. NAZARETH, PA. FINENESS STRENGTH TRADE MARK PORTLAND UNIFORMITY

SAMUEL H. FRENCH & CO.,
Sole Agents,
PHILADELPHIA.

Established 1844.



DUMB WAITERS AND HAND ELEVATORS.

Trunk Lifts,
Invalid Lifts,
Carriage Elevators,
Freight Elevators,
Sidewalk Elevators,
Hatchway Hoists.

All of most improved design and construction.

Sedgwick Machine Wks.,
88 Carroll Street,
POUGHKEEPSIE, N. Y.
New York Salesroom, 128 Liberty St.

Catalogue on application.
Estimates on request.

THE "GLOBE" VENTILATOR

In Brass, Copper, Galvanized Iron and with Glass Tops for Skylight Purposes. Also

"Globe Ventilated Ridging"

For Barns, Residences and Buildings of every character. Far superior to a Cupola.

Send for Description and Price List.

Manufactured by **GLOBE VENTILATOR CO.** Troy, N.Y.

Improved Quick and Easy Rising Steam, Electric and Hand Power Safety

ELEVATORS

AND DUMB WAITERS.
Automatic Hatch Gates.
Send for Circulars.

KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kimball Elevator Co., Cleveland, Ohio, 245 Vincent St
Branch Offices:
120 Cedar St., New York. 108 11th St., Omaha, Neb

To the Student of Drawing

For a thorough groundwork in architectural—draftsmanship there is no course of study equal to that provided in Edminster's Architectural Drawing. It is modern, thorough and well graded.

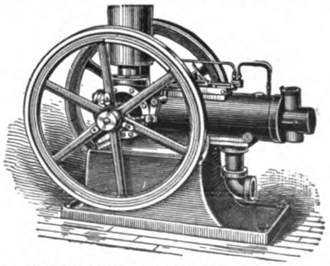
Contains 105 full page plates beautifully rendered, illustrating the various details of construction, &c., and full explanatory text.

Size 7 x 9 inches, oblong
Two Dollars Prepaid

David Williams Co., Publishers
14-16 PARK PLACE, NEW YORK

ELEVATORS AND DUMBWAITERS

that can be placed in position by any carpenter.
Catalogue Free,
Energy Elevator Co.
407 Cherry St., - PHILA., PA.



MIETZ & WEISS

OIL ENGINES

Stationary and Marine, 1 to 60 Horse Power

GOLD MEDAL AT ST. LOUIS

A. MIETZ
128 to 138 Mott St. 87 Elizabeth St
NEW YORK

LOOK OVER THE SIMONDS SAWS, and you will see the points of advantage.

FIRSTLY, they are ground a true taper, which enables the user to run the Saw with very little Set.

SECONDLY, each Simonds Saw is handled by a mechanic who thoroughly understands the hanging of the Saw, which guarantees this most important feature.

THIRDLY, the filing and setting of the Simonds Saws are carefully done, and thoroughly inspected, so that the Saws, on leaving the factory, are ready for work.

FOURTHLY, the steel used in the manufacture of the Simonds Saws is a high carbon crucible steel, and will hold its cutting edge much longer than the ordinary steel generally used.

FIFTHLY, each Saw is put up in a separate case, thus avoiding fingering and rust marks commonly found on Saws that are not encased properly.

SIXTHLY, because every Simonds Saw is guaranteed thoroughly.

Any mechanic trying a Simonds Saw, and not finding same satisfactory, may return the Saw, either to the dealer or to the Simonds Mfg Co., and get either a new Saw or money paid back.

SEND FOR CATALOGUE AND PRICE LIST.

SIMONDS MFG. CO.,

Fitchburg, Mass Chicago, Ill. New York, N.Y
Portland, Ore. Seattle, Wash.

SIMONDS MFG. CO., Ltd., New Orleans, La.
SIMONDS SAW CO., San Francisco, Cal.

STANDARD MINERAL WOOL

LOOKING ALL WAYS FOR BUSINESS

COLUMBIA MINERAL WOOL CO.,
Room 918, 112 Clark St. CHICAGO.
Samples and Circulars Free

Fireplace Mantels
MADE OF
Ornamental Brick
$12 and up.

Last longest—look best—are not too costly. There's no other kind so good—so pleasing. Our Sketch Book tells all about them. Write for it.

PHILA. & BOSTON FACE BRICK CO. - P. O. Box 8613 - BOSTON, MASS.

OUR FINE HARDWOOD FLOORING
SHOULD BE THE BEST.

We have been making PARQUETRY for TWENTY YEARS. We have our own saw mill and timber tracts and two factories. Send for our trade discounts and our Design Book No. 5.

WOOD-MOSAIC FLOORING CO.
ROCHESTER, N. Y. NEW ALBANY, IND.

Heat Makers Fuel Savers

KELSEY WARM AIR Generators are not only fuel savers, but there are many other good reasons for the statement that the Kelsey is the very best heating apparatus made, for use in home, church or school heating.

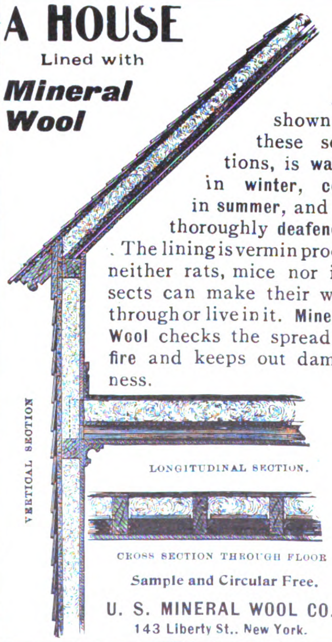
℄ Send for our booklet, "About the Kelsey," and look into its construction and the Kelsey method of warming and distributing air throughout the house. Compare its weight and heating surfaces with other heaters having same fuel capacity—if you can find out about the others.

℄ Send for booklet, "What the Users Say," and see what hundreds have to say about Kelsey economy and efficiency.

26,000 in use.

Kelsey Heating Co.
MAKERS,
SYRACUSE, N. Y.
New York Office, - 156 Fifth Ave.

A HOUSE
Lined with
Mineral Wool



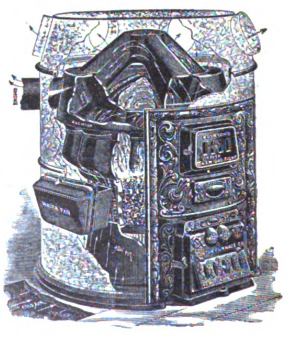
As shown in these sections, is warm in winter, cool in summer, and is thoroughly deafened. The lining is vermin proof; neither rats, mice nor insects can make their way through or live in it. Mineral Wool checks the spread of fire and keeps out dampness.

Sample and Circular Free.

U. S. MINERAL WOOL CO.,
143 Liberty St., New York.

The Boynton Furnace Co.
SOLE MFRS. OF

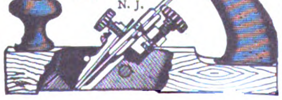
Boynton's Furnaces,
Ranges,
Hot Water Heaters,
Steam Heaters, Etc.



207-9 Water Street, New York.
147-9 Lake Street, Chicago.

Irons warranted: Plane is returned money refunded.

NEW SELF-SETTING PLANE
Sample sent as per circular if not kept by dealers.
GAGE TOOL CO., Vineland, N. J.



MILLER'S HAND MORTISER.

For Mortise Locks. Time Per Door, Three Minutes.

Sold on Trial for $12.00.
$4.00 with order, balance in thirty days.

ALBERT W. MILLER MFG. CO.,
Cincinnati, Ohio, and Riverside, Calif.

CARPENTRY AND BUILDING

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

FEBRUARY, 1906.

Building Operations in 1905.

The year just closed will go down in history as the most remarkable in the building industry that the country has ever known. The results have more than borne out the indications of the early spring, when there existed a most hopeful feeling regarding the amount of work to be done, and from every section of the country reports are at hand to the effect that 1905 has broken all records in the value of its building improvements. It is the exception rather than the rule to find a city of any importance showing a decrease in the value of its building operations, as compared with the year before, and even these are traceable to special causes. A very noticeable feature of the situation is the extent to which building has been carried on in the smaller cities and towns and especially in the rural districts, where the growing prosperity of the country has been reflected in the erection of farm buildings of all kinds, as well as improvements to old structures. At one time it was thought that the increased cost of labor and of all materials entering into building construction would tend to check aggressive operations to some extent, but this seems not to have been the case. Again, the attitude of labor during the year was favorable to continued activity in this important branch of industry, and where differences did exist between employer and employed the friction in most cases was not of sufficient duration to seriously interfere with the momentum which the building movement had acquired. Locally the record was one of which we may justly be proud, for at the close of the year more new structures had been completed, more were under way and more planned than was the case at the close of any previous year in the history of the city. This in some measure is traceable to the fact that the year was comparatively free from labor troubles and that all available mechanics in the various branches of the trade were fully employed. Another explanation is found in the fact that it was the first year since the great strike that normal conditions had existed in the city. The volume of operations was upon an enormous scale, the value of the improvements for which permits were issued aggregating nearly a quarter of a billion dollars in the five Boroughs of the city, while new construction to the value of almost $150,000,000 was completed. This far exceeds in value the best records of former years, and what is most gratifying, practically every section of the city shared in the activity.

Classification of Buildings.

According to the figures of the Building Department of the Borough of Manhattan, 7041 permits were issued for new buildings and alterations, estimated to cost $138,852,272, as against 3813 permits for building improvements calling for an outlay of $84,172,185 in the 12 months of 1904. A noticeable feature of last year's record was the number of tenement houses, especially those costing more than $15,000 each. Of these there were 1412, for which permits were issued aggregating a valuation of $73,510,000. In the way of private dwelling houses costing more than $50,000 each permits were issued for 18 involving an estimated outlay of $2,368,000; of stores there were 63 for which plans were filed, estimated to cost $11,810,000; of office buildings there were 40, costing $9,938,400, and of manufactories and workshops there were 85, requiring an estimated investment of $5,578,825. The value of the hotels and boarding houses for which permits were issued was $5,185,000; of the 25 schoolhouses projected, $2,309,500; of municipal public buildings, $3,896,000, and of places of amusement, $2,975,000. The actual number of new buildings commenced during the year was 1841, as compared with 1149, in 1904, and the new buildings completed numbered 1246, as against 1074 in the previous 12 months. Above the Harlem River, in the Borough of the Bronx, the tremendous stimulus given to building operations in 1904 was continued through 1905, when improvements were planned calling for an expenditure of $38,251,300, which was an increase over the previous year of $15,327,400. In the Borough of Brooklyn the value of the building improvements for the year just closed reached a total of $70,989,900, while in 1904 the figures were $49,326,690. There was an unusual amount of building in the outlying districts of the city, and in the Borough of Queens structural work aggregating $15,010,526 was planned during the year. An analysis of the figures available shows that the work in Greater New York consisted very largely of tenements, flats, apartment houses and private dwellings, attributable in great measure to the fact that for some time past there had existed a dearth of buildings of this character growing out of the practical cessation of operations during the two years of the labor troubles in the city. The new year opens with bright promises for the coming spring and summer, and with the work already planned and in prospect there is every reason to feel that 1906 will witness a most gratifying volume of building operations not alone in this city but throughout the entire country.

Schoolhouse Ventilation.

The capacity that an indirect steam or hot water radiation plant or the furnace warming installation has is an important factor where gravity systems of this type are installed for schoolhouses or buildings where ventilation is an important feature. Now that legal requirements are in force in some States with respect to the volume of air that must be supplied to a school building, based on the number of pupils accommodated therein, it has become especially important that the relation which the air supply capacity of such a system has to its general proportions be carefully considered. Such systems already in use, depending solely on differences of temperature for the required air circulation, have met the requirements of the laws governing them, as attested by inspectors especially appointed for the work of accepting school heating systems. There is no question, however, but that the gravity indirect system is one which gives varying quantities of air, according to the atmospheric conditions. In coldest weather, with certain temperatures obtaining in the indirect heating surfaces, definite air velocities will result, and for different temperatures different volumes of air will be supplied. In times of warmer weather, with about the same temperature of the indirect heating surfaces, the resulting velocities will be

less and consequently the volumes will be less. This being the case, how is one to proceed if it is necessary to meet the requirements in average winter weather? It is laid down in the laws mentioned that air must be supplied in sufficient quantities, so that 30 cubic feet are circulated throught the building in a minute per capita for the total number of pupils for which the building is designed. If the proportions of the system are laid out on this basis for minimum weather conditions a less volume of air will be supplied when the average outside temperature occurs unless the heating surfaces are warmed very high in order to offset the effect of the increased outside temperature. This in all cases—at least in the majority—would be impracticable, as the amount or air needed for ventilation and admitted into the rooms at a relatively high temperature is sufficiently great to provide the heat lost through the exposed walls of the building—that is, the transmission losses. Calculations of indirect systems on a theoretical basis are very much involved and for the present, at least, the arbitrary laws in existence must be followed. The point is, however, is it wise to plan on the basis of 30 cubic feet per minute per capita only for the coldest conditions? Might we not better adopt some such figure as 40 cubic feet per capita? We are then better able to give to the building an approximation of 30 cubic feet throughout a wider range of winter temperatures. This should also give a plant well able to cope with emergencies and one of a character that is wisest for the man who has some regard for his reputation to adopt. It will be noted that in the article elsewhere in this issue on schoolhouse warming and ventilation the author has employed the factor 40 in determining the heat necessary for warming a given room.

A Novel Association of Architects.

Among the architectural associations of the country, probably the most unique is the Chicago Architects' Business Association. Some ten years ago the architects of the city concluded that there were a number of vexing problems that affected the welfare of the profession and which were of a nature that could not be advantageously cared for by the Chapter of the Institute. It was decided, therefore, to form a society to take up these questions which leaned toward the business side of architecture, and the Chicago Architects' Business Association was organized. That there was reason for its being is shown by the fact that for a decade it has constantly gained in strength and influence, says a writer in the *Inland Architect*. It was the chief instrument in obtaining the passage of the architects' license law of Illinois. It has achieved many reforms in the conduct of the city building department and in the relation of architects to contractors, and has been largely instruental in the revision of the building laws. Early in its career the association made a thorough investigation of the city building department and found, as was expected, an utter lack of competency among the heads of the department, and, to say the least, very lax methods prevailing throughout. There was no check upon the kind of building that might be erected by any owner who had influence with the department. So flagrant was this condition that there was no market for buildings that rigidly conformed to the building laws. They could not compete in price with the buildings of cheap construction, glossed over to present a fair appearance, erected by owners who were allowed to evade every building law in the code with impunity. These abuses the business association undertook to reform. They employed an inspector to visit questionable jobs and to report fully upon violations of the building ordinance. These violations were systematically reported to the building department but were usually defended or entirely ignored. The association thereupon took up the subject with the aldermen and mayor and forced the issue so strongly that an investigation of the department was made which resulted in ousting the building commissioner responsible for the violations. The department was reorganized and has shown a great improvement. Special permits are now of rare occurrence and when issued are thoroughly investigated by the association, which usually succeeds in having them revoked.

Much attention has been given to a revision of the building ordinances and the dominating influence of the association has been shown in this direction. So careful and systematic has been the work in this connection that the association's printed records of the building laws and code are more accurate than those of the city itself. Many differences between architects as a class and building associations have been adjusted. The business association maintains an arbitration committee of seven members, who are frequently are called upon to settle disputes and whose findings are accepted as final. A hand book is issued annually which contains the building and lien laws, papers read before the association during the year, besides much general information on building subjects, tables, &c. This annual is a source of considerable profit, as is the building contract form adapted to local needs, prepared by the association. Without these sources of revenue the association would be hampered in its work, much of which involves considerable expense. The initiation fee and dues are so low as to be favorable to the large membership that is desirable. Any licensed architect of the city is admitted to full active membership. The association deeply laments the recent loss by death of its secretary, Charles R. Adams, to whose efficiency, years of devotion and untiring efforts the association attributes a large share of its success. No similar association exists elsewhere, but the success achieved by the Chicago Architects' Business Association is such that the architects of other cities may well consider the advisability of organizing along the same lines for the accomplishment of similar objects.

New York State Association of Builders.

It is officially announced by Secretary James M. Carter that the next meeting of the New York State Association of Builders will be held at Niagara Falls on January 31, with headquarters at the Hotel Imperial. There will be business sessions in the morning and afternoon and in the evening a banquet will be tendered the delegates by the Builders' Association of Niagara Falls. We understand that the watchword of the convention will be "More Apprentices."

National Association of Master Sheet Metal Workers.

The next meeting of the Board of Trustees of the National Association of Master Sheet Metal Workers will be held in Baltimore February 20. We understand that invitations will be sent to manufacturers of tin plate and sheet iron to attend this meeting, with a view to co-operating with them to secure satisfactory material. Invitations will also be sent to all sheet metal workers throughout the country, whether members of the association or not, in order that a full discussion may be had of this interesting subject.

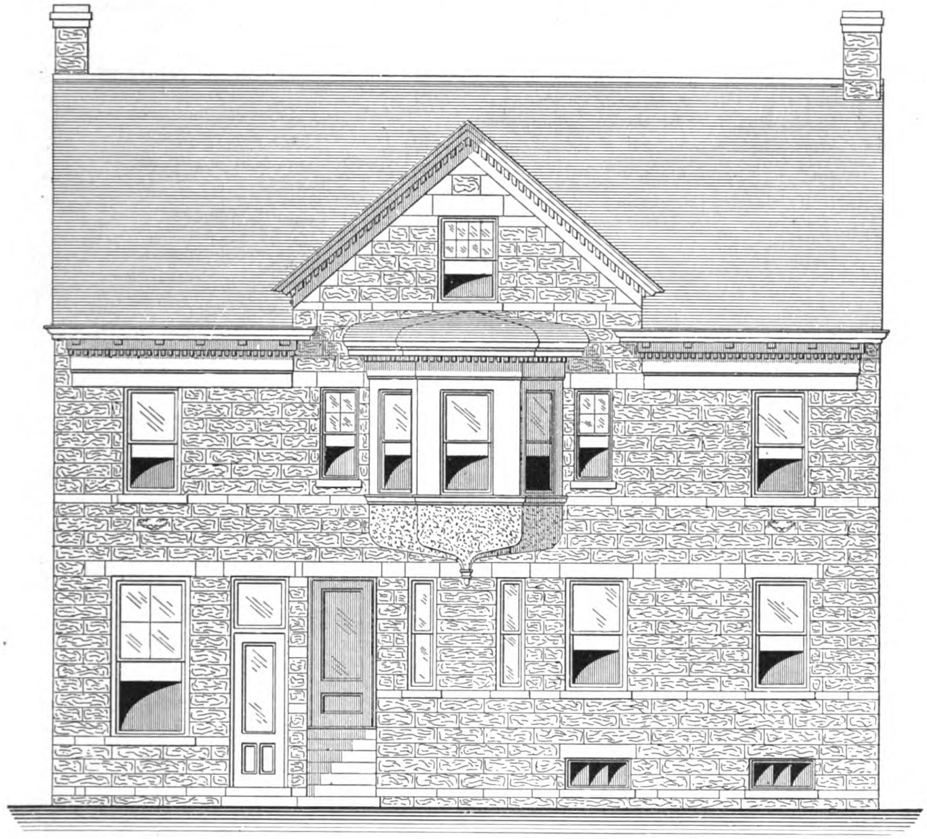
◆◆

THE twenty-eighth annual exhibition of the Society of American Artists will be held at 215 West Fifty-seventh street, New York City, from March 17 to April 22, inclusive. Various prizes are offered, including what is known as the Webb Prize, the Carnegie Prize and the Julia A. Shaw Memorial Prize.

GAS HEATING in St. Petersburg is reported to be under way on a large scale in that city. A company is being formed to exploit gas for cooking and bath heating. It is to undertake to heat rooms by gas and also to install cooking ranges and fire places so that in winter every one may have his rooms heated better and more cheaply than is done with wood.

DWELLING AND OFFICE OF HOLLOW BLOCK CONSTRUCTION.

A MOST interesting example of the use of hollow cement blocks in building construction is found in the dwelling house and office illustrated herewith. The half-tone supplemental plate which accompanies this issue affords an excellent idea of the appearance of the finished structure, clearly showing the effects produced by the use of the rock-faced blocks and the results which it is possible to secure in connection with this material. The floor plans and details presented upon the pages which follow show the arrangement of the rooms and the manner in which the work of construction is done. The house is that of George J. Wolf, who is engaged in the coal business on Fourth street, Elizabeth, N. J., and one room on the first floor is arranged for use as an office.



Front Elevation.—Scale, ⅛ Inch to the Foot.

Dwelling and Office of Hollow Block Construction.—J. A. Oakley & Son, Architects.

According to the specifications of the architects, the walls above footings are of concrete blocks made on a Winget machine and laid in mortar composed of one part Portland cement, one part lime and three parts sharp sand. The footings are of concrete 8 inches deep and 16 inches wide and composed of one part Atlas Portland cement, three parts sharp sand and four parts one-inch broken blue stone. The lintels over the doors and windows are of concrete, reinforced through the center with a length of three-inch wrought iron pipe. All window and door sills on the sides, rear and front walls, also the chimney caps, are of Portland cement and sharp sand in the same proportions as the composition for the concrete blocks. All caps for piers are five inches thick and consist of solid concrete blocks. The entire cellar bottom is covered with concrete composed of one part Portland cement and three parts sand and gravel, well mixed, and spread five inches thick. On top of this is a one-inch coat composed of one part Atlas Portland cement and two parts sharp sand floated off smooth.

The girders are of Georgia pine. The first and second floor joists are 2 x 12 inches, and the third story floor joists are 2 x 8 inches; all placed 16 inches on centers. The rafters for the main roof are 2 x 10 inches, placed 20 inches on centers. The partition studding is 2 x 4 inches, placed 16 inches on centers, and the bridging is 2 x 3 inches, cut between each floor and ceiling beam. The roof is covered with ⅞ x 9 inch North Carolina pine ship-lap, the boards being laid diagonally with the face side to the rafters. These in turn are covered with two-ply tar paper with a two-inch lap, over which are laid 9 x 18 inch black slate from the "Bangor" quarry.

The first, second and third story floors are of ⅞ x 3½ inch North Carolina pine flooring boards, laid in courses and blind nailed. All inside jambs are of cypress ⅞ inch thick and have ½ x 2½ inch molded edge stops. The stairs have cypress strings and North Carolina pine risers. The outside doors are veneered with white pine on the outside and on the inside with cypress, the inside doors being of cypress.

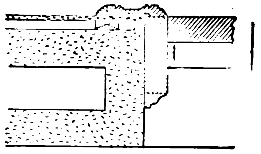
The kitchen is provided with a No. 258 portable Provident Richardson & Boynton range with water back, a 35-gallon galvanized boiler and a 20 x 36 inch galvanized iron sink, supplied with hot and cold water connections. In the cellar is a set of two Alberene stone wash trays, each tub connected with hot and cold water fixtures. In the bathroom is a John Douglas "Gloria" water closet, a five-foot iron enameled roll rim "Perfecto" bath tub, a 20 x 28 inch iron enameled lavatory with 12-inch back, and a 15 x 19 inch bowl, all in one piece and set on

iron enameled brackets. All exposed pipes and fittings in the bathroom are nickel plated.

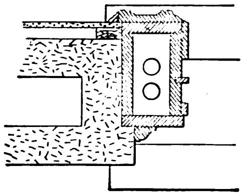
The house is piped for gas and wired for electric lighting. All wires are concealed and the meter is placed in the kitchen. A three-inch electric bell is placed in the kitchen, with a push button at the front door.

All exterior wood work has two coats of white lead and linseed oil and all frames were given a coat of metallic paint on the back before they were set in the walls. All metal work has two coats of graphite paint. All the interior wood work has one coat of liquid filler and two coats of Flood & Conklin's No. 1 coach varnish. The main stair treads and platforms have a coat of filler and two coats of floor varnish. The outside of the bathtub has three coats of white paint, and all exposed pipes and the boiler in the kitchen have a coat of aluminum bronze.

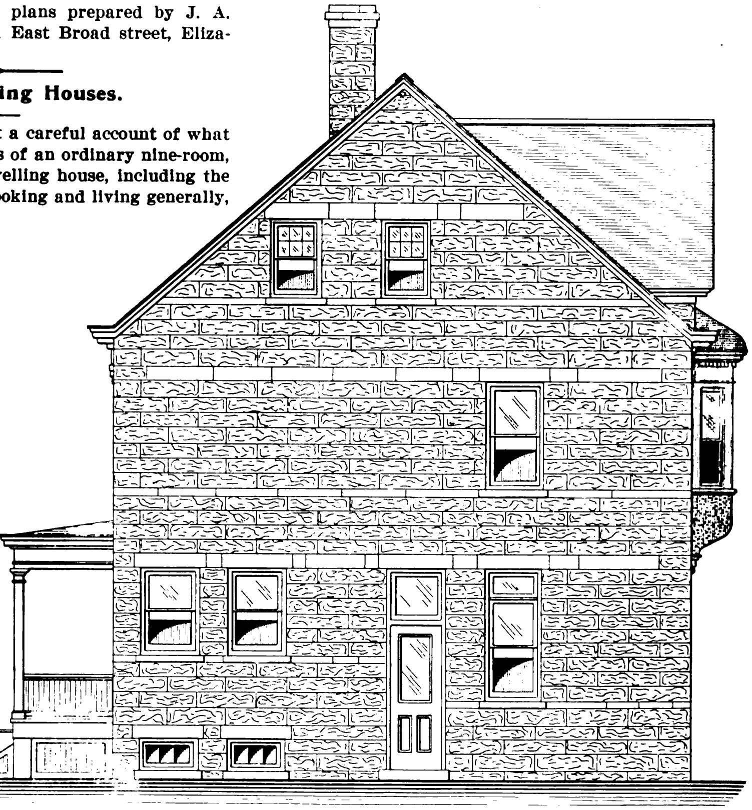
The dwelling and office here shown was erected for Mr. Wolf in accordance with plans prepared by J. A. Oakley & Son, architects, 1201 East Broad street, Elizabeth, N. J.



Detail of Window Frame.



Horizontal Section through Door Frame.—Scale, 1 Inch to the Foot.



Side (Left) Elevation.—Scale, 1/8 Inch to the Foot.

Dwelling and Office of Hollow Block Construction.—Elevation and Constructive Details.

Heating Dwelling Houses.

For many years I have kept a careful account of what it costs to heat the living rooms of an ordinary nine-room, two-story and attic wooden dwelling house, including the fuel burned for all purposes, cooking and living generally, says Egbert P. Watson in a recent issue of *The Metal Worker, Plumber and Steam Fitter.* In this estimate the entire cost of coal is considered for 12 months, summer and winter. Manifestly the greatest expense is incurred during cold weather, for then two fires are maintained, as against one in summer. The house is what is called semidetached, being separated from other buildings by an alley 4 feet wide. There are the usual number of doors and windows in the rooms, with the exception that in two there are large bay windows with 40 square feet of glass in each. The other rooms have about three windows, each averaging 18 square feet, with one exception, that of the bathroom, which has a large window of about 28 square feet of glass. In all there are nearly 10,000 cubic feet of space to be heated to an average temperature of 75 degrees in cold weather. During this period the kitchen range is run for about 12 hours only, but the house heater is run for 24 hours without cessation.

Cost of Heating with Stoves.

These two fires require two tons of 2000 pounds monthly, a few pounds more or less, according as the temperature varies from zero to 20 degrees above zero. The coal used is pea size in both stoves, costing $4.25 delivered in the cellar. This makes the fuel cost $8.50 per 30 days calendar, or 21.2 cents per diem of 18 hours average duration when fires are burned. This work is accomplished by two stoves, one a double heater and the other a common kitchen range with a hot air pipe (exclusive of the smoke pipe), which enters the room above it.

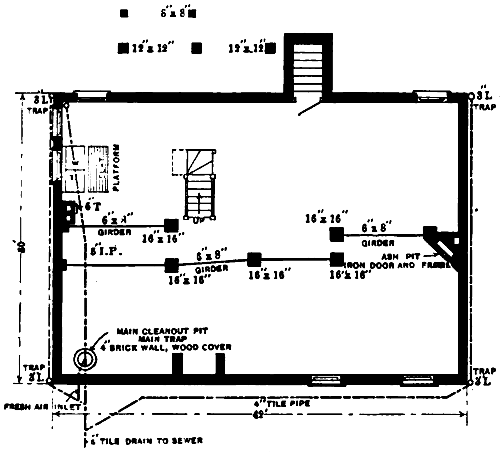
Revising the data already given, the actual expense for coal in one year is $62, or 17 cents per day for 365 days, winter and summer. This is with pea coal, but when nut or stove coal is burned the cost is much greater, while the amount needed is the same. For example, a friend has a steam heater which consumes two tons monthly heating the same number of cubic feet that I do nearly, but his coal costs (nut size) $6.25 in the cellar, as against $4.25 for pea size. This extra cost arises from the fact that his grate will not burn small coal. The fact remains, however, that the same weight of coal is required to run the steam heater as is needed to run the stoves. I have been under the impression that the base burner double heater, as it is called, was the most expensive method of heating a dwelling house, but the facts disclosed in the previous lines show that the difference is not marked.

Cases of Absurdly High Coal Consumption.

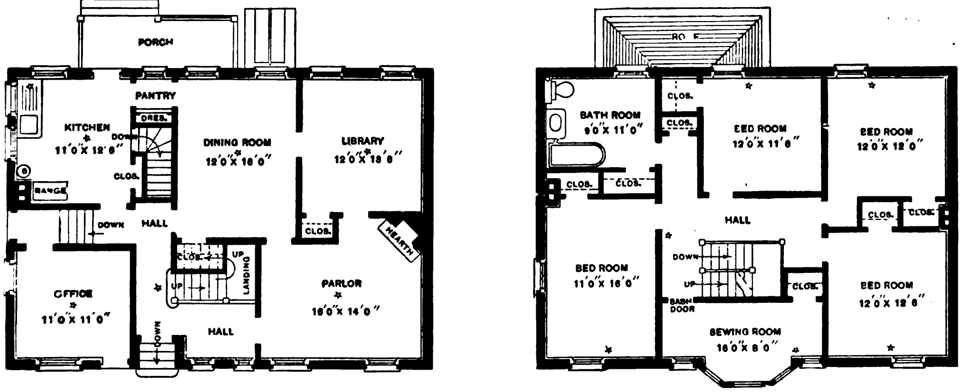
I have cited here only instances where the fuel has been used intelligently by persons who understand burning it, not those where it has been wasted, but where the quantity used was accurately known. I found a number of other cases where the consumption was absurdly high for the cubic feet heated. In such places the fuel is simply thrown away for want of knowledge in using it. Manifestly they do not come into the question of economy. Some of the owners of the wasteful furnaces burn more than double the coal that they should. I found houses where the same cubic feet of space had to be warmed by burning four tons of coal monthly in lieu of two and others using two tons of coal in five months to heat

about 15,000 cubic feet of space, even then complaining that they hadn't heat enough. Of course mere space does not cover all situations. One dwelling may be exposed on all sides to every wind that blows, another may be filled in on the lower story and protected materially from losses by radiation. But all of the cases named were wooden frame houses in a city and under the same general conditions.

If, as has been asserted in previous lines, there is no material difference in the cost of heating a cubic foot of air by a furnace, a stove or by steam radiation there is a vast advantage in the management of the different systems by the saving of labor and absence of dust in the living rooms. The stove has the great objection of requiring cleaning fires and replenishing them directly in the rooms; all coal and the resulting ash have to be carried in and out, necessitating a great deal of dirty work in cold weather, all of which are absent in furnaces below stairs, whether for steam, hot water or hot air. But this is in some sense compensated for by the gain in the direct heat given out by the stove—that is to say, the radiation occurs where it can be utilized in the direct heating of the living rooms, while furnaces lose a great deal by heating the cellar to a greater or less extent, which is a partial loss. No insulation of jackets is so perfect that all heat is prevented from passing through them, while the hot air pipes themselves are also sources of loss. It is anomalous that there should be so much uniformity of the cost of heating a cubic foot of air in the several systems in general use. Aside from my own investigations on this matter, I have asked the opinions of some plumbers who put in heating apparatus as to the economy of each, and their experience coincided with my own, even going further by saying that in a small installation of heating plants they would advise the use of stoves instead of furnaces. A consideration in favor of stoves is possibly a fanciful one, but it has weight, especially with those who like to see a fire as well as feel it. In cold weather a furnace heated room has a much less cheerful aspect than one where the ruddy glow of the flames or incandescent fuel is diffused around, adding to the sense of warmth and comfort by the very appearance of it.



Foundation.



First Floor. Second Floor.

Dwelling and Office of Hollow Block Construction.—Floor Plans.—Scale. 1-16 *Inch to the Foot.*

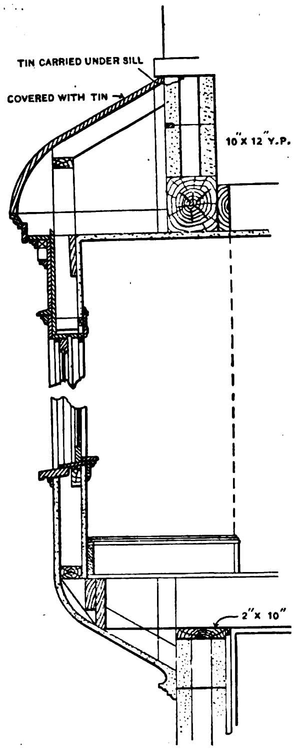
Whether stoves or less direct agents for heating rooms are used the art of burning fuel or regulating the consumption of it properly is essential if economy is expected or desired. There are those who are not compelled to consider this aspect of the subject, but the majority have to, and a large part of them never seem to be able to understand the management of a coal fire. They constantly poke, shake and otherwise ravage the burning fuel until it gets dull and sullen, turning into incombustible clinker before it is half consumed. Then they say the coal is good for nothing and try some other kind, only to meet with the same result so long as they pursue the same practices. The whole art and mystery of running an anthracite fire is to let it severely alone after it is once thoroughly alight. When this occurs the only thing needed is to let it burn, adjusting the draft so as to give air enough to keep the fuel incandescent. When the fire appears to be getting dull and gives out no more heat do not rasp and stir it violently, but add more coal evenly and in a small quantity until it is alive again, opening the draft slightly until the fuel gets under way again. Then the ashes which have accumulated may be gently dislodged by shaking or poking until the grate is clean. In this way a hot fire can be kept indefinitely.

◆

Church of Unique Architecture.

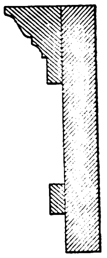
The new church which is nearing completion at the corner of Madison avenue and Twenty-fourth street, New York City, is something of a radical departure in city church architecture, and the following comments regarding it, taken from the handbook of the Presbytery of New York, may not be without interest:

The Madison Square is of rare beauty, designed not on mediæval, but on semiclassic lines, and marks an innovation in church building, reverting to the early, simple, pre-Gothic forms, and preserves, although nearly surrounded by skyscrapers and overtopped by lofty towers, a most striking, imposing and consistent individuality. It is cruciform in plan, with the arms of the cross projecting but slightly beyond the square mass. The structure maintains its dignity owing to the dome and an impressive portico, the columns of which outweigh in scale anything in the immediate vicinity. It is built upon a white marble base of buff brick and glazed terra cotta. The six columns of the portico have shafts each measuring 30 feet and are of pale green granite. The capitals of the column are Corinthian, the color scheme

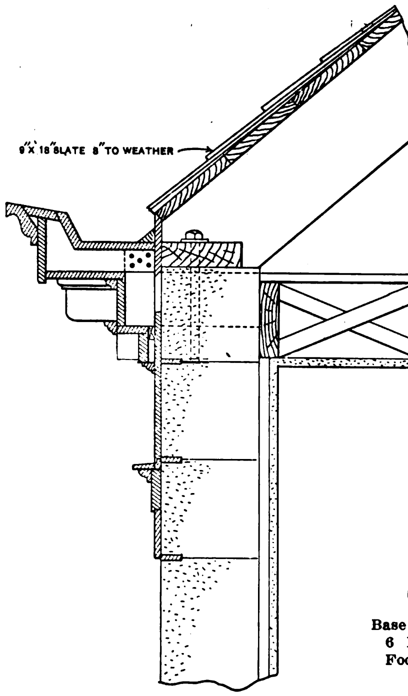


Section through Second-Story Bay.—Scale, ⅜ Inch to the Foot.

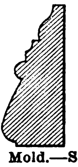
Section through Casing.—Scale, 3 Inches to the Foot.



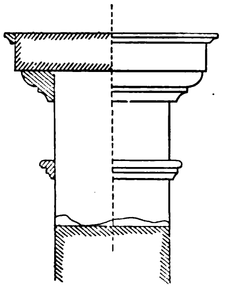
Head Casing.—Scale, 3 Inches to the Foot.



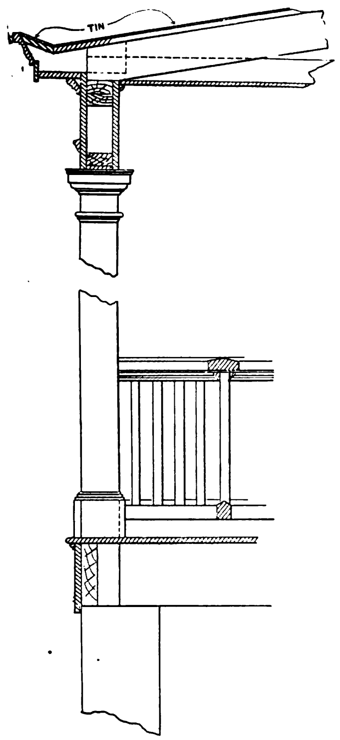
Detail of Main Cornice.—Scale, ¾ Inch to the Foot.



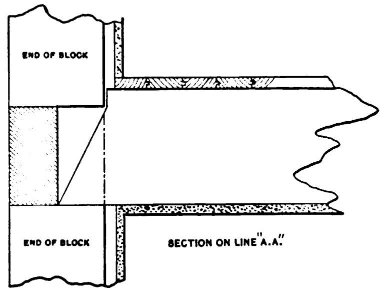
Base Mold.—Scale, 6 Inches to the Foot.

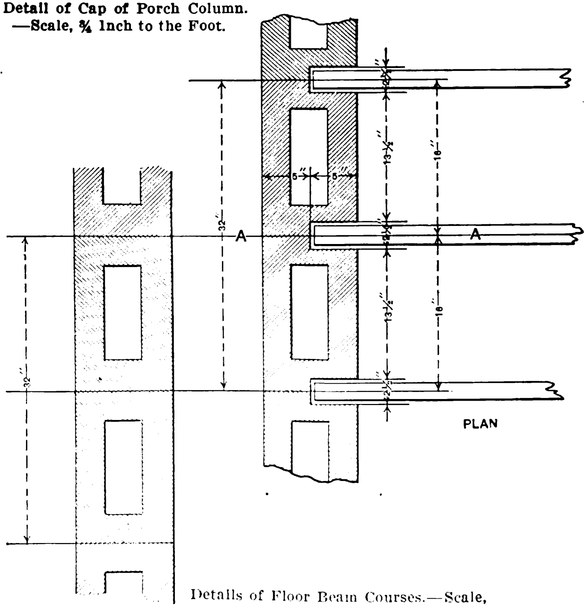


Detail of Cap of Porch Column.—Scale, ¾ Inch to the Foot.



Section through Rear Porch.—Scale, ½ Inch to the Foot.

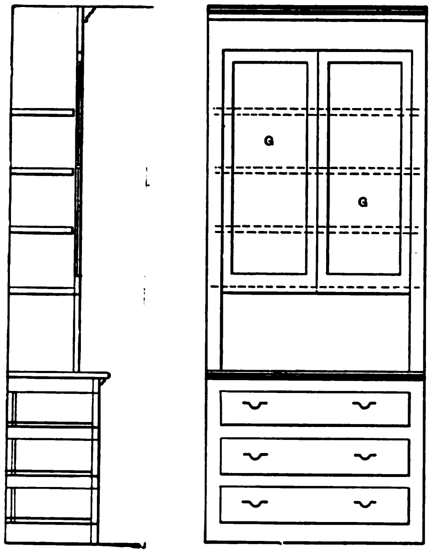




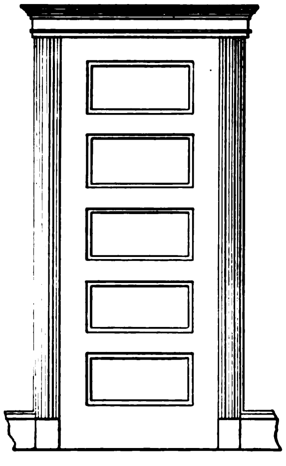
Details of Floor Beam Courses.—Scale, ¾ Inch to the Foot.

Miscellaneous Constructive Details of Dwelling and Office Hollow Block Construction.

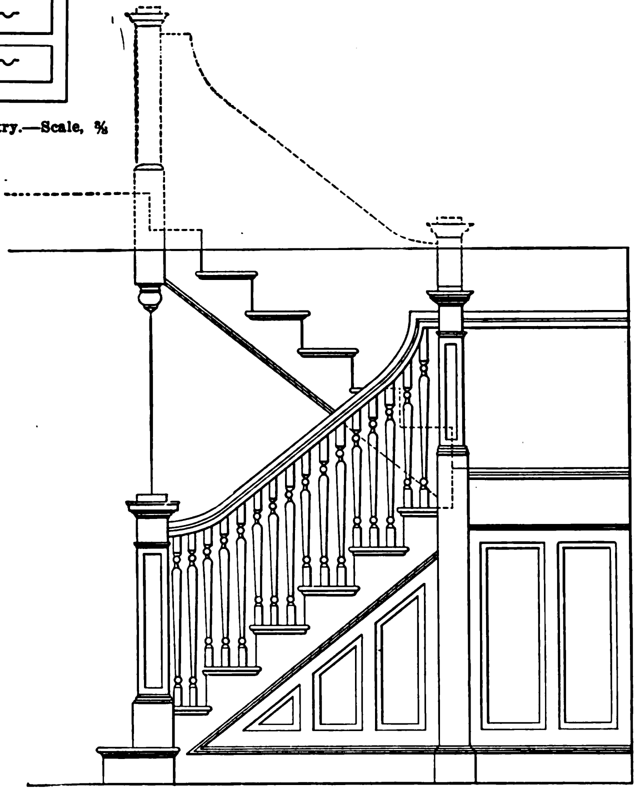
being blue, white and yellow, and all other features reveal a delicate and appropriate use of these same shades with the addition of green. As in many Syrian and Roman characters, the dome is tiled, showing the alternating pattern of green and yellow, the green serving as a background. To sustain and enrich this effect the dome is surmounted by a gold lantern. The interior is no less pleasing in effect and provides every comfort and convenience for a well ordered modern church.



Section and Front Elevation of Dresser in Pantry.—Scale, ⅜ Inch to the Foot.



Elevation of First Story Doors.—Scale, ⅜ Inch to the Foot.



Detail of Main Stairs.—Scale, ⅜ Inch to the Foot.

Dwelling and Office of Hollow Block Construction.— Miscellaneous Details.

◆

THE STEEL SKELETON BUILDING has given another evidence of endurance against the ravages of time in connection with the tearing down of the Plaza Hotel in New York, and this fact is of no little importance in the light of doubts that have been expressed that the concrete and terra cotta casing about metal building frames did not necessarily protect them. The hotel was built about 1879, so that it is more probable that the metal work was rolled iron than mill steel but the fact that in razing the structure the metal work everywhere was found in excellent condition is the essential thing. Even the floor beams of the kitchen and laundry, where there was much chance of moisture reaching them, as was shown by the rotted condition of the flooring and other wood work, were unaffected by rust. This condition of the metal surfaces was all the more noteworthy because of the fact that the frame work had not been protected by paint or any form of preservative compound, at least so it is understood.

◆

Laying the Engineers' Club Foundation Stone.

The foundation stone of the new building of the Engineers' Club, on West Fortieth street, New York City, opposite Bryant Park and the new public library, was laid December 24 by Mrs. Andrew Carnegie, whose husband, standing by, declared the task well and truly done. The ceremony was quite informal, but the club was well represented by its officers and committees, including President W. H. Fletcher, Past President John C. Kafer and Charles Haswell, the veteran engineer, now in the ninety-sixth year of his age. The architects, Whitfield and King, were also present.

The records deposited in the stone included a Bible of 1905, a club book of 1905, copies of the *Herald*, *Tribune*, *Sun* and *Times* of December 23; a copy of the certificate of incorporation; a booklet of the old club house at 374 Fifth avenue; a half dollar, quarter dollar, dime, nickel and one cent; a card of W. L. Crow, the builder; a copy of Mr. Carnegie's letter of gift to the Engineering Societies and the Engineers' Club; a chronological history of the club; a list of members elected since the publication of the club book this year; a list of the incorporators of the club; the programme of competition for the selection of architects for the two buildings, and floor plans of the new house.

MINNESOTA STATE ASSOCIATION OF BUILDERS' EXCHANGES.

THE fourth annual convention of the Minnesota State Association of Builders' Exchanges was held according to programme in Duluth on Wednesday, December 13, and with it closed the third year of the organization. The meeting was the best one which has yet been held and the impression prevails that its influence will bear fruit in increased membership and broader scope of work. The year just closed was most productive of good results and has demonstrated very fully the benefit of a State organization.

The first session was called to order by President Corning, and the members listened to an address of welcome by J. F. Schleunes, president of the Builders' Exchange of Duluth. He was followed by President Corning, who delivered his annual address, in which he reviewed the progress of the year, calling attention to the healthy growth in the membership, to matters of legislation which have been pending, and made some recommendations which in his opinion it would be well for the Association to consider. Next in order was the report of Secretary and Treasurer A. V. Williams of St. Paul, following which were reports from various committees. An interesting feature of this session was the authorization of the secretary to furnish the press with an account of the proceedings.

At the afternoon session the committees to which had been referred various matters presented their reports, among the number being that of the Nominating Committee, of which George W. Higgins was the chairman. The report recommended the following officers for the ensuing year, who were unanimously elected by the chairman of the committee casting the ballot.

President, J. W. L. Corning of St. Paul.
First Vice-President, W. A. Elliott of Minneapolis.
Second Vice-President, Otto Johnson of Duluth.
Third Vice-President, A. H. Hatch of Faribault.
Secretary-Treasurer, A. V. Williams of St. Paul.

For the Committee on Resolutions, George M. Gillette made the report, thanks being expressed to Governor Johnson for his influence and appointment to the State Board of Control, resulting in the publication of bids for the construction of public buildings. A recommendation that no local exchange adopt rules which shall work as a restriction in the dealings of its members with members of any other exchange, brought out a spirited discussion. The object of it appeared to be to allow general contractors to buy their materials of sub-contractors in other towns when the latter are members of the home exchange. After being extended so as to provide that all dealings as far as possible should be with members of some affiliating local exchange, the resolution was adopted. On the labor question the Association went on record as pledging itself to uphold "broad American ideals of fair play and justice without favor or discrimination" and favored the "open shop."

In the evening the members attended a banquet at the Spalding, which was a most enjoyable affair. After the many good things provided for the guests had been duly considered, President Schleunes of the Duluth Exchange introduced James R. Quigley as toastmaster of the evening. He in turn called upon Mayor M. B. Cullum of Duluth, who talked to the builders in a very complimentary way. The toasts of the evening included "The Benefit of a State Organization," to which response was made by J. W. L. Corning, the new president of the State Association. J. F. McGuire, president of the St. Paul Exchange, spoke for that organization. An important point in his remarks was that he belonged to the Builders' Exchange not for the purpose of getting something out of it, not for the purpose of making money out of it, "but because of the fraternal spirit." In concluding his remarks he offered the following suggestion: "In all your dealings with your fellow members of the Exchange practice loyalty. Be loyal to each other. In this way you can make it worth while for a busy man of affairs to join with you." Z. D. Scott of Duluth spoke for "Our Exchange," pointing out that the building season had been a prosperous one and, from the plans already in view for the coming season, expressed the belief that the total would aggregate $5,000,000. W. A. Elliott of Minneapolis was assigned the toast "Builders," on which he spoke in a serious vein. Other speakers were George M. Gillette, who was introduced as the "Carnegie of the West;" R. E. Denfeld, superintendent for 21 years of the Duluth public schools; William H. Hoyt of the Government Engineering Service, who spoke as an engineer of his experiences with builders; George Rusk, president of the Builders' Exchang at Fargo, and Senator G. R. Laybourne of Duluth, who spoke of building laws which he had assisted in placing upon the statute books. George M. Gillette presented a resolution of thanks to the Duluth Exchange and to Duluth citizens generally for their hospitality and to the press for its fairness in reporting the meetings, which was unanimously adopted.

Convention of Pennsylvania State Association of Builders' Exchanges.

Supplementing our report last month of the fourth annual convention of the Pennsylvania State Association of Builders' Exchanges, held in Pittsburgh December 5 and 6, it may not be without interest to briefly refer to some of the leading points touched upon by James Emery of New York, secretary of the Citizens' Industrial Association of America, in the excellent address which he delivered before the delegates to the convention. This address was one of the features of the meeting, and in considering his subject Mr. Emery spoke convincingly of the urgent necessity of all employers' associations taking up the employment bureau feature and assisting all worthy applicants in securing an opportunity to work. "We should endeavor," he said, "to protect the nonunion man in the rights guaranteed by the Constitution of the United States. We have come to the stage to-day where we say that the issues in this case are no longer squabbles over wages and hours, but they are eternal and fundamental principles, that are as essential to the future of this city as the principles which our fathers gave it when they builded it; and the work of defending these principles is not a work of the employer or employee alone; it is the work of every citizen in that relation which he bears to the State. The position we occupy to-day is one of positive principle; it is not a position of compromise, nor is it a position of surrender. Our position is that there are certain fixed principles upon which its institutions rest and upon which the Republic is framed, and those things are essential to its life and progress; and that digging down into the industrial question, beneath the struggle for wages and hours, and the condition regulating employment, we get to the fundamental bed-rock of that principle, and to that we cling, without compromise or surrender, always keeping before us the cardinal principle of American public life in the settlement of its industrial difficulties."

A number of important resolutions were adopted by the convention, some of which were referred to in our last issue, but the following outline of the entire list may not be out of place at this time:

Declaration for the open shop.

Creation of large surplus for the purpose of educational and organization work.

Approval of the uniform contract for the use of the members.

Effectual safeguards in the construction of buildings.
Proper legislation on uniform lien laws.
Payment of workmen on basis of services rendered.
Night trade and manual training schools.
Uniform apprenticeship system.
More harmonious relation between employer and employee, effecting the abolition of the labor agitator.
Uniformity in action combining the interests of shippers to secure beneficial railway rates.

CONSTRUCTION OF A PLATFORM STAIRWAY.

By Morris Williams.

Recently I had occasion to design and construct a platform stairway for a large department store in Scranton, Pa., and thinking the matter may be of interest to some of the readers of the paper I will describe how the work was done. In the building there were already three stairways leading from the first to the second story and there was something wrong with each one. It had been noticed that customers generally left the store rather than go through the exertion necessary to travel over such constructions. One flight was so steep as to cause it to be called the "stepladder," the other two were so placed as to need a guide to find them. The proprietors of the store probably have no conception of the loss in money they have sustained owing to their erroneous notions respecting the relative value of easy transit from one story to another.

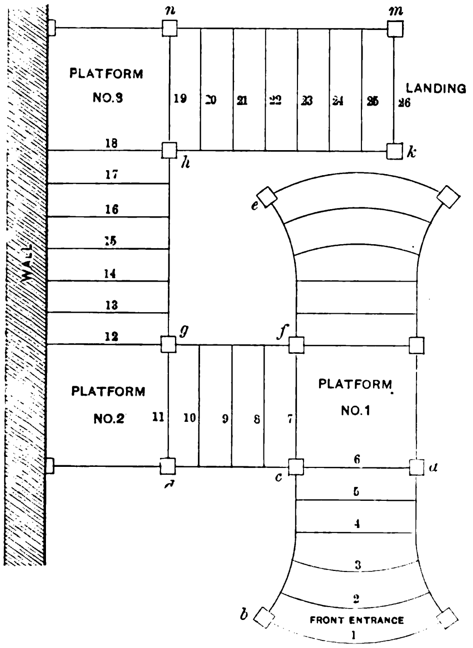


Fig. 1.—Plan of Stairs, Showing Various Platforms.

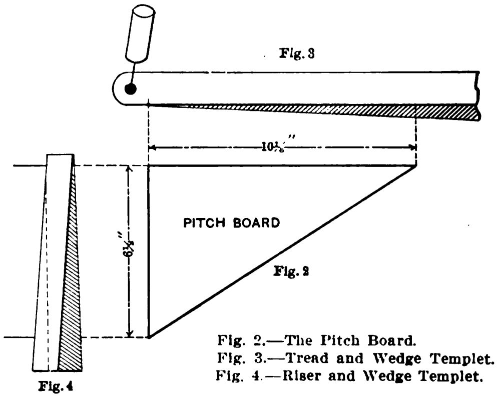


Fig. 2.—The Pitch Board.
Fig. 3.—Tread and Wedge Templet.
Fig. 4.—Riser and Wedge Templet.

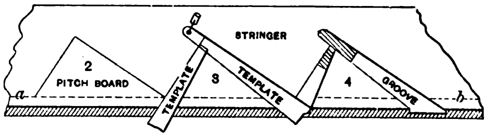


Fig. 5.—Showing Application to Stringer of Pitch Board and Templets.

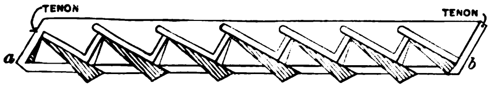


Fig. 6.—View of Stringer Grooved and Wedges in Place.

Construction of a Platform Stairway.

The stairway under consideration embodies a radical innovation and is placed directly in the center of the store, with a short flight facing the front entrance and another short flight facing the rear entrance. Both flights have swell steps and stretchout stringers, an arrangement which greatly adds to the utility as well as to the appearance of the structure. It will be observed from an inspection of the plan, Fig. 1, that these flights meet at the same platform, which in our description we will designate as No. 1. From this platform the stairs turn at right angles, landing on platform No. 2. From this point they turn again at right angles to platform No. 3, and finally from this point reach the landing at the second story. The complete structure contains 26 risers, but as they are distributed in the manner shown and each small flight has a resting platform the exertion in ascending and descending is reduced to a minimum.

With such a plan as this the only possible way of spoiling the job would be in the misproportioning of the treads and risers and varying the pitch of the flights by having for each flight a different pitch board. For proportioning the treads and risers different authorities have as many different methods of procedure, all of which, however, come so near one another in actual results as to make it immaterial which method to use. The one I have found to give very satisfactory results is to take the width of the riser for a divisor and the figure 66 for a dividend. For example, assuming the riser to be 7 inches wide we divide 66 by 7 equals 9 3-7, which will be the best proportional width of tread for a 7-inch riser. Again, assume 4 inches to be the width of the riser we divide 66 by 4, which gives us 16½ inches, the proportional tread. By reversing the operation we may find the width of riser when the width of tread has already been decided upon.

In the construction with which we are dealing it was decided that the tread should be at least 10 inches wide, as they should be in public buildings, and where the run is not restricted a 12-inch tread would be a much better arrangement. To find the best proportional riser for a tread of 10 inches we divide 66 by 10, which gives 6 6-10 inches for the width of riser. Being thus equipped with the knowledge of the relative proportion between risers and treads which will guarantee an easy stepping stairway we are ready to lay out the details.

The pitch board, Fig. 12, will be the first to claim our attention. In laying it out it will be necessary to know the exact hight between floors, which in this instance is 14 feet 1 inch, or 169 inches. Dividing this by 26, the number of risers, we find the quotient to be 6½ inches, which determines the width of the riser. To find the proportional tread divide 66 by 6½, obtaining as a result 10 2-13 for the width of tread, or a little over 10⅛ inches.

We lay out a pitch board of 1-inch stuff, having one edge measuring 10⅛ inches, the width of the tread; the other edge 6½ inches, the width of the riser. This triangle is to be used as a templet on the face of the material intended for stringers and to mark the outlines of the treads and risers. A plan view of it is shown in Fig. 2.

Two other templets will be needed to mark the thicknesses of the treads and risers combined with the size

of the wedges. These are indicated in Figs. 3 and 4, respectively, while in Fig. 5 the pitch board and the two templets are shown applied to the stringer. At 2 in this figure is shown the pitch board and at 3 the two templets applied to mark the outlines of the "housing" or "grooves," and at 4 the groove is shown housed.

In Fig. 6 is shown a stringer grooved and the wedges in place. It contains eight risers and seven treads, the number of treads and risers contained in the top flight of the stairway, as shown in Fig. 1 from platform No. 3 to the landing at the second story. A small tenon is added to the length at each end, as shown, to enter the newels. All the other stringers are treated alike.

We will next take up the newel post at the first flight connecting with the stretchout stringer. In Fig. 7 we show the elevation of this newel, as well as of the complete bottom flight of stairs. We want to know its exact length and the location of the squares opposite the point where the rail and stringer intersect it. Let the length of the short baluster be 2 feet 2 inches from the nosing to the bottom of the rail and continue the line representing the bottom of the rail to the center of the newel, as shown at *b*. From 2 draw the level line 2 *c* and from *c* upward mark the thickness of the rail, as indicated. By adding the measurements thus found from the floor line to the top of the rail we obtain the exact length of the newel. From the floor line to *a* we have the hight of the riser, 6½ inches; from *a* to *b* the length, 2 feet 2 inches, of the short baluster; from *b* to *c* a length equal to 7 inches, representing the hight of the rise in the rail decided upon for a suitable easement, and from *c* to the top of the rail, 3 inches. These items added together equal 3 feet 6½ inches, which will be the exact length of the newel from the floor to the top of the rail.

The location of the squares on the newel to receive the stringer and the rail are shown by the shaded parts in the diagram and are opposite the rail and stringer, respectively. In the diagram there is also shown another newel reaching from the floor to the first platform, the plan of it being indicated at *a* in Fig. 1. In Fig. 7 it is shown reaching from the floor to and a little above the platform rail. From the floor line to 1, the line of the platform, is the hight of six risers, each 6½ inches, equaling 3 feet 3 inches. From 1 to 2 is 2 feet 2 inches, the length of a short baluster; from 2 to 3 is 11 inches, and from 3 the thickness of the rail. Adding these items together we have 6 feet 7 inches, which represents the full length of the newel from the floor line to the top of the platform rail.

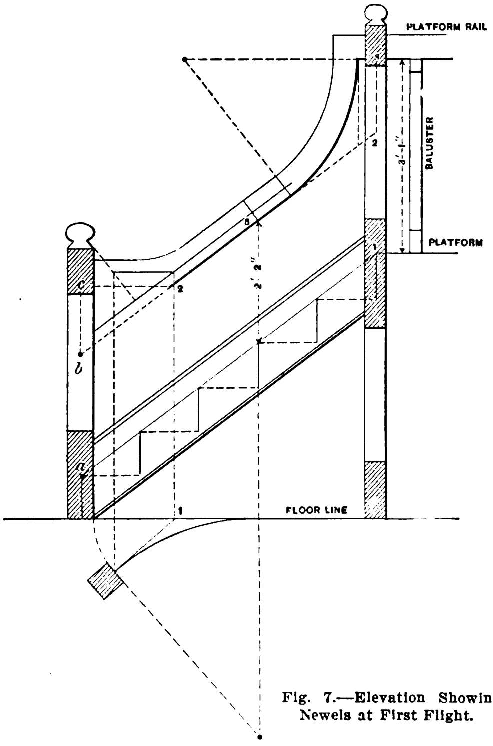


Fig. 7.—Elevation Showing Newels at First Flight.

The baluster shown between the platform floor and the platform rail is 3 feet 1 inch long made up, as shown in the diagram, from 1 to 2 of the length of the short baluster, and an addition of 11 inches from 2 to 3. This 11 inches is determined by the method shown in Fig. 8, and should be carefully considered, as it defines a very important item in the construction of platform stairways—namely, the securing of similar "easements" and "goose necks" for the rails to all the flights that the stairway may contain. Fig. 8 represents a partial elevation of two adjacent flights with a newel between, a case similar to the one shown at newel *c* in Fig. 1. The nosing line of the bottom flight cuts the center of the newel at 2 and that of the upper flight at *o*, a distance above 2 equal to the width of one riser, 6½ inches.

If the arrangement was to run the upper rail straight to the newel the under side of it would cut the center of the newel in *o*, but if an easement, as shown in the diagram, is determined upon, then the rail will have to be raised, as shown from *o* to 3, or to any other point decided upon. In this case it was decided that by fixing the point 3 at a distance of 4½ inches from *o* and taking everything into consideration we would obtain the best results, one of which was a suitable length for the platform baluster, as shown in Fig. 7.

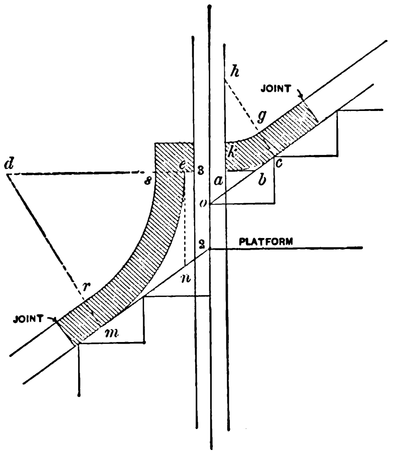


Fig. 8.— Partial Elevation of Two Adjacent Flights, with Newel Between.

Construction of a Platform Stairway.

It will be observed that any addition to the hight of point 3 increases correspondingly the hight of the platform rail, and therefore the length of the platform baluster. Another very desirable result of this arrangement was the satisfactory limit it gave to the hight of the "knee" in the goose neck, owing to its being a point common to the easement of the upper rail and of the goose neck of the lower rail, as shown in Fig. 8.

Having in this manner fixed upon point 3 at a distance of 11 inches above the nosing line and thus determining the hight of all the easements and goose necks, we are now prepared to draw the templets, only one of which will be needed for all easements and only one for all the goose necks over the flights except the goose neck at the top landing, which, owing to the landing rail being 2 feet 8 inches high, necessitates a change in its form.

To draw the easement in Fig. 8 make *b c* equal *b a*, and from *c* at right angles to the pitch of the rail draw the line *c h*. Take *h* as center, with *h c* as radius, and turn over to *a*. Again take *h* as center, with *h g* for radius, and turn over to *k*.

To draw the templet for the goose neck proceed as

follows: Draw the line 3 a at right angles to the newel; from e draw the line $e\ n$ parallel to the newel; make $n\ m$ equal $n\ e$, and from m square to the pitch of the rail draw the line $m\ d$. Now take d for center, with $d\ m$ as radius, and turn over to e; again take d for center, with $d\ r$ as radius, and turn over to S. The templets are shown by the shaded portion of the diagram and extended a trifle beyond the curves, so as to make a better joint with the straight rails. In Fig. 9 is exhibited the elevation of the left hand side of the stairway looking from the direction of the front entrance, the newels being indicated in plan, Fig. 1, at b, c and d, respectively. The platform baluster here also is 3 feet 1 inch in length, or same as those on platform No. 1. In Fig. 10 is presented the elevation of the newels marked in plan, Fig. 1, at e, f, g, h and k and of the stringers and rails between them. Fig. 11 represents the elevation of the newels m and n of the plan, Fig. 1, and of the stringer and platform No. 3. The baluster on this platform will also be 3 feet 1 inch in length.

It will be observed that the baluster under the landing rail, shown in Figs. 10 and 11, are only 2 feet 8 inches long, this being the hight desired for the landing rail at the second-story floor. This treatment calls for a goose neck of different form and dimensions from those already described. In Fig. 12 we show how to form the templet. A few steps are drawn adjacent to the landing newel and also a line to represent the floor at the second story. From this line we measure 2 feet 8 inches, the length of the baluster, thus fixing the hight of the landing rail. From the nosing line of one of the steps we measure 2 feet 2 inches, the hight of the short baluster, and draw the lines to represent the rail of the flight. The rest of the work is similar to that explained in connection with Fig. 8.

In Fig. 13 we show the plan of the platform joist, where the one marked a is kept back a certain distance from the newel post. In Fig. 14 is shown the elevation of this platform, as well as an elevation of one of the carriers that support the flight, the upper end of the flight being sustained by the joist a of Fig. 13, thus indicating the necessity of keeping this joist back, as stated.

We will now take up the method of drawing the face mold for the wreaths over the stretchout stringers at the bottom of the two first flights. In Fig. 16 we show the plan of the curved rail described from the center o. The plan tangents are shown at $a\ b$ and $b\ c$, respectively. The tangent $a\ b$, as shown at 2 c in Fig. 7, is a level tangent, while the tangent $b\ c$ and shown from 2 to 5 in Fig. 7, is inclined, the inclination being that of the flight, as represented in the pitch board. From b, in Fig. 15,

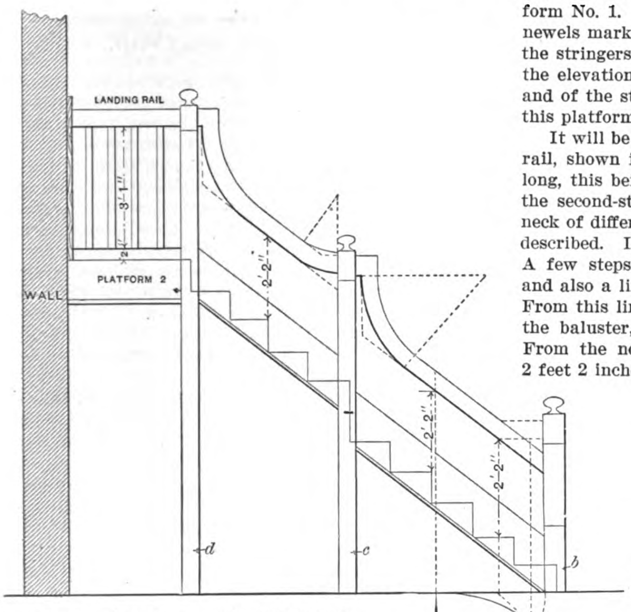


Fig. 9.—Elevation of Left-Hand Side of Stairway Looking from Front Entrance

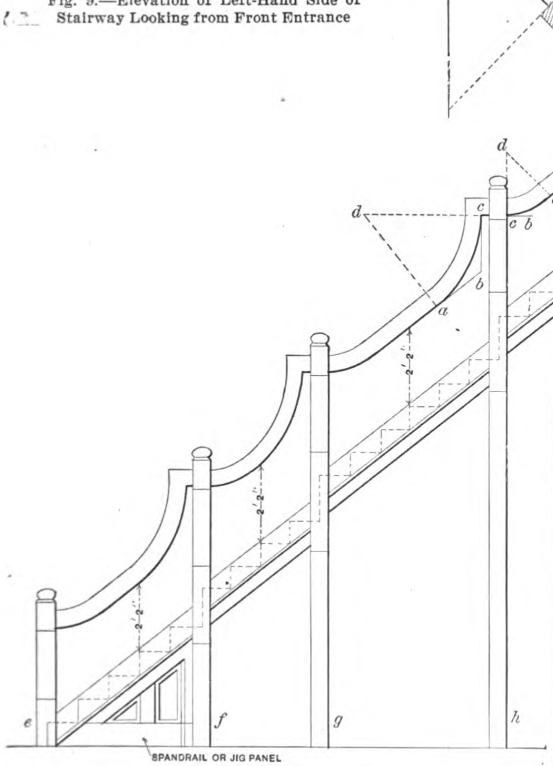


Fig. 10.—Elevation of the Newels Marked on the Plan Fig. 1 at e, f, g, h, k.

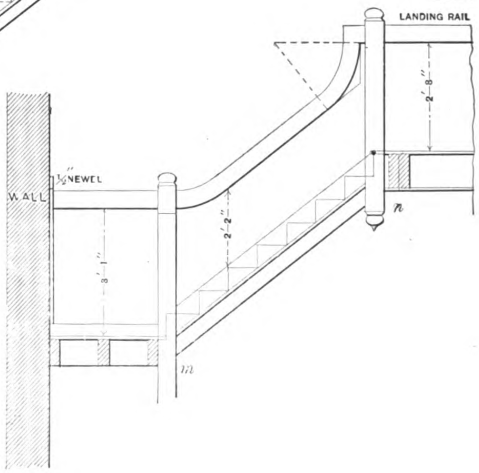


Fig. 11.—Elevation of Newels m and n of the Plan Fig. 1.

Construction of a Platform Stairway.

draw the line $o\ c''$, with the pitch board. This line represents the elevation of the plan tangent $b\ c$. From a draw the line square to $n\ c$; through n and square to $b\ c''$ draw the line $m\ n\ a''$. Place one leg of the compasses at b, extend the other to a and describe the arc indicated by the dotted line $a\ a''$. Now connect a'' with b and the line will represent the bottom level tangent, as it is required on the face mold, while $b\ c''$ will represent the other tangent of the face mold. Draw the joint at a'' square to the tangent $a''\ b$ and the joint at c'' square to the tangent $b\ c''$.

We will draw the curves of the mold by means of a single ordinate. The line 2 3, which is drawn parallel to the plan level tangent $a\ b$, will be the plan ordinates, and the line 4 5, which is made parallel to the level tangent $a''\ b$, will be the ordinate across the face mold.

The principle here used is to make the two ordinates the same lengths—that is, 2 3 to equal 4 5. By this operation we are enabled to locate the points 4 and 5, which are contained in the curves of the face mold.

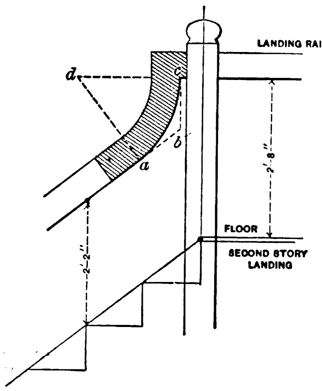


Fig. 12.—Showing How to Draw Gooseneck to Correspond with Hight of Landing Rail.

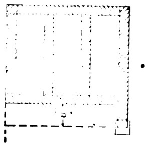


Fig. 13.—Plan of Platform Joist.

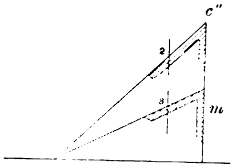


Fig. 16.—Bevels to Square the Wreath.

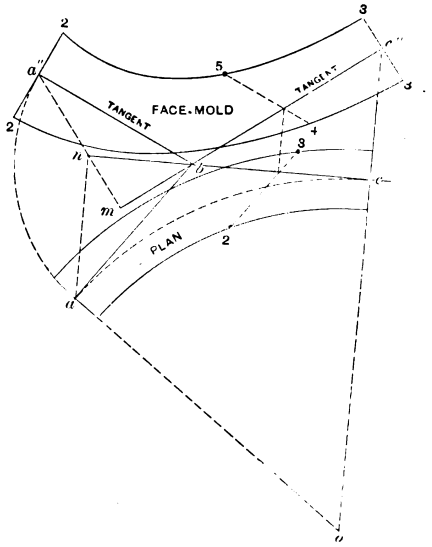


Fig. 15.—A Very Simple Method of Drawing Face Mold for the Stretchout Wreath.

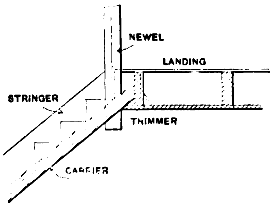


Fig. 14.—Elevation of Platform Shown in Previous Figure.

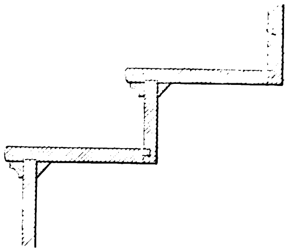


Fig. 17.—Section through Stairs.

Construction of a Platform Stairway.

We shall next need to find the width of the mold at each end and for this purpose will refer to the bevels shown in Fig. 16. In order to find these make $a\ n$ equal $a\ n$ of Fig. 15 and $n\ m$ equal to $n\ m$ of the same figure; connect $m\ a$; the bevel is at m and is to be applied to the end c'' of the mold.

Again make $n\ c''$ equal to $c\ c''$ of Fig. 15 and connect $c''\ a$. The bevel will be at c'' and is to be applied to the end a'' of the mold.

Draw the lines 2 and 3 at a distance from the line $n\ m\ c''$ equal to half the width of the rail on each side of a'', in Fig. 15. Place the distance c'' 2 of Fig. 16, as shown at a'' 2 of Fig. 15. On each side of c'' of Fig. 15 place the distance m 3 of Fig. 16, as indicated by c'' 3, in Fig. 15.

We have thus located three points which are contained in the inside curve, and three points that are contained in the outside curve. By bending a lath to touch the points 2, 5, 3 we are enabled to describe the inside curve, and by bending it so as to touch the points 2, 4, 3 we are able to describe the outside curve. Thus completing the mold. As the four wreaths have similar plans and elevations this mold will suffice for them all, and of all methods to develop the mold it is undoubtedly the most simple.

* * *

A Mammoth Wind Mill.

What is said to be the largest wind mill ever constructed in the United States, if not in the world, has recently been erected on the ocean beach near the famous Seal Rocks, not far from San Francisco, Cal., and is used for pumping water into Golden Gate Park. The huge, strong wooden tower supporting the wind arms rises 130 feet. It is 40 feet square at the base, very securely anchored and gradually tapers upward, assuming a round shape. There are four immense wooden arms or vanes. Each arm measures 80 feet from the center or hub, thus making a diameter of 160 feet in describing the circle. The wind vanes are 6 feet wide and extend nearly the entire length of the huge arm, thus affording the greatest possible amount of wing space for catching the air.

This colossal wind mill is capable of developing about 50 horse-power—its maximum capacity. Its pumping capacity is 200,000 gallons of water every 24 hours. The water is taken from the wells and forced through a large iron main 10 inches in diameter for nearly four miles up into an immense reservoir several hundred feet higher than the ocean beach. From this reservoir the water is distributed in all directions through the park.

* * *

Reinforced Cement Dome.

A reinforced dome and tower under construction at the Central Railway passenger station at Antwerp, Belgium, rises from the top of the main building at an elevation of 130 feet and is carried up to 260 feet above the ground, the dome forming an arch of 32 feet 8 inches radius, 68 feet 4 inches diameter. The dome has a double shell 6 feet 6 inches from shell to shell, contracting to 3 feet 3½ inches under the apex, as described by *Cement and Engineering News*. The face of the inner shell forms the ceiling of the dome and is highly ornamented and paneled, all molded in place as the work progressed. The outer shell of the dome is 3.15 inches thick. The completed dome weighs only 1800 pounds. The difference in weight between reinforced concrete and any other form of substantial construction was the leading cause for the adoption of reinforced concrete in this work.

CENTERS FOR ARCHES OF DOUBLE CURVATURE*—I.

BY CHARLES H. FOX.

IT goes without saying that there are probably few problems in the art and science of carpentry which present greater difficulty to the mechanic than are found in the construction of a "circular sash which is circular in plan," spoken of generally as a "circle on circle arch." The writer is not alone in the opinion that this problem is of equal, if not of greater, importance than those to be found in connection with the most intricate parts of stair building. By reason of its importance the very best workmen in every land have probably given more attention to its solution than to any other. Let any one attentively examine the circular head of a door or window frame standing in a circular wall and he will at once become convinced of the difficulties which have to be overcome before the essential conditions of the work are obtained. How is it possible for any one to hope to produce the desired results with the requisite accuracy without some positive rule for his guidance, and yet attempts have been made regardless of rule and expense, but with what consequences; nothing short of a mass of wretched and deformed curves, which are anything but a credit to the workman.

Solution of the Problem.

Several writers on carpentry have devoted space to the solution of this rather intricate problem. The great Peter Nicholson in his works described methods for getting out the various molds and bevels, but, like many others who have followed him, he confined his descriptions chiefly to the projections required by the cylindro-cylindric, which, it may be remarked, is altogether comprised of right lined parallel elements—that is, no portion of its surface is warped or twisted. Few writers there are, indeed, who have attempted to describe methods by means of which the several developments may be constructed as are required to produce the warped surface of which the soffit and exterior top surfaces of a symmetrically connected radiant arch may be formed. We speak of a "symmetrically constructed" arch for the reason that the writers who have come under the notice of the author of these lines have substituted a conical surface—that of a scalene cone—for the conoidal surface which forms the soffit of the geometrically correct radiant arch. While this may be correct in a cheap construction, one in which the exterior is comprised entirely of wood and where the whole of the work pertaining to the circular frame and sash may be done by one method and by the one man, it becomes in connection with brick and stone construction a very different matter, more especially where the stone cutter draftsman works independently of the methods which may be employed by the millman in the construction of the frames and sashes that may be required in the interior finish of the arch.

Different Methods Employed.

Again, in brick construction one firm of millmen may have the contract to supply the frames and sashes and another for supplying the centers over which the brick arches may be turned. Now unless the workmen of both firms make use of a similar method in the construction of the separate pieces of work it will be simply a matter of chance as to their taking up with each other in a proper manner when placed in position — that is, the frames will not coincide with the curved line as given at the back of the brick soffit. This in general is a cause of friction between the two sets of workmen. Those who finish the frames blame those who got out the centers, and of course those who got out the centers are just as positive that they are right and the blame should rest on the others. If the truth were known neither one is right, for they have not made use of the correct geometrical principles which should govern the constructions in question.

In stone construction the arch proper may be cut and built in the wall quite a time before a call is made for the forms, so that if any misfit occurs it is generally the millman who is called upon to alter his work. As a rule, however, the stone cutter draftsman has from the very first week of his apprenticeship been taught that "all straight lines which lie in the soffit surface of the radiant arch are level lines and radiate toward the axis of the wall." In brick work he has carried out this well established principle and so executes as far as possible a correctly constructed arch. On the other hand, the millman has perhaps followed the teachings as given by Robert Riddell, J. V. H. Secor and others, and has substituted the conical surface for that of the twisted surface, with the result that the frame does not coincide with the back arris of the arch in the manner which it should. Consequently the frame has to be reconstructed at a loss to the millman. Whereas had proper geometrical principles obtained at the outset everything would have been correct, time and labor would have been saved and friction averted.

This is not an unusual occurrence, but who is to blame? We answer, no one but those teachers who have placed such misleading methods before their respective readers. We shall, in the drawings which follow later, show the difference made between that of the curve of the "geometrical method" and that of the "conical method." Another point of which we may make mention is that many teachers for some reason fail to give any explanation of the geometrical principles involved in the constructions, &c., of the problems in which they are attempting to instruct their students. On account of this omission the student has been unable, after having copied the example given, to proceed further, for the simple reason that he has no knowledge of the laws which should guide him in the developments, whereas did he thoroughly understand the geometrical principles involved he would be able to go ahead and work out any example that might present itself in actual practice.

Elementary Geometry.

In these pages it is the intention of the author to endeavor to reduce this rather difficult problem to the range of elementary geometry. In doing this he will endeavor as far as possible to make use of the language of the shop, but at the same time when illustrating and explaining the principles of geometry as applied to the special subject he will call lines, &c., by their proper names, for it seems just as simple a matter for any average workman to be able to "conceive of a plane," no matter as to its position in space, as it is to draw the line, which, as the case may be, represents the plan or elevation of the plane. In order to assist the student in obtaining this knowledge the writer has at the outset explained the method by means of which cardboard representations of solids may be constructed, these illustrating in a very practical manner the inclined position of the plank, the development and application of the bevels, together with the development of the curves of intersection as are required in order to get the face molds. The two larger sides of the model will represent the vertical faces of the plank and the lines projecting thereon will show the manner in which the thickness of the plank may be obtained. It is, perhaps, hardly necessary to state that this is a problem not yet shown in any of the printed matter bearing upon arches in circular walls.

The great advantage of a cardboard representation such as the above over any other means of instruction may readily be seen, for the student immediately after the drawing is completed may, by folding the sides into their respective positions, have at once a practical proof of the constructions he has just made. It is unnecessary for him to spend time in sawing, planing, &c., as would be necessary in order to obtain the same result in wood or other material. Not only has the cardboard model this advantage, but the lines, being at its exterior, are open for inspection and their connection at each plane of construction may be seen at a glance. If, then, the student is in doubt as to any projection, as, for example, the difference in the angle made of the bevels required in

---

the incline plane of the plank to that given in the corresponding projections in the plan, which is, of course, taken to represent a horizontal plane, he can, by a close study of the model and of the constructions made at its surfaces, readily understand the reason for the change in the angle made by the two projections. It is for these reasons that the author so strongly advocates the construction of cardboard models or representations of the solids out of which the finished pieces may be formed.

In the practical application of the science of geometry to the subject the problems most essential and those which will first be explained are intersections and angles made between planes, sections of prisms and of cylinders, and the development and intersection of cylinders, more especially those problems which relate to the development of cylinders which may intersect cones, cylinders and conoids.

As the system of projection which will be made use of in the drawings which follow is called orthographic projection, a brief recapitulation of the laws and principles relating to it will be of service to the young student and perhaps to the older ones. Orthographic projections are of use in representing the real size and form of magnitudes, as is seen in exact constructions, or "working drawings." The first law of orthographic projection is that it shall allow magnitudes to be shown in their true forms and relative size. From this it follows that the three dimensions of a magnitude must be represented in their true size, and for this purpose it is necessary to represent any magnitude on two planes of projection, at right angles to each other. One of these planes of projection being horizontal in space, it is called "the horizontal plane of projection"; the other being vertical, is called "the vertical plane of projection." Other planes employed in solving a problem are called "auxiliary planes." The intersection of the two planes of projection is called the "ground line." In practice generally the projections made in the horizontal plane are called the "plan," while those made in the vertical plane are called the "elevation." We may further observe the planes of projection which are at right angles to each other in space both coincide with the plane of the paper in practice. We may enumerate 39 noticeably different positions which a line may have in reference to the planes of projection, but only four of these need be mentioned for the purpose of showing the relation of lines in space to their projection, in respect to relative situation and size.

1. When a line is parallel to the ground line each of its projections will be parallel to the ground line and will be equal to the given line.

2. When a line is parallel to either one only of the planes of projection, its projection on that plane is equal and parallel to the line in space and its projection on the other plane is parallel to the ground line and is shorter than the line in space.

3. When a line is perpendicular to either plane of projection its projection on that plane is a point and on the other plane is a line equal to the given line and perpendicular to the ground line.

4. When a line is oblique to both planes of projection both of its projections are oblique to the ground line and shorter than the given line.

We wish particularly to impress upon the mind of the young student the importance attached to his obtaining a clear conception of the meaning of the laws and principles above enumerated, for upon this depends in a great measure his further progress. Space will not permit of giving a more extended explanation, and for the same reason we are unable to present graphical illustrations of the first three principles as given above; so for a more complete elucidation of them we must refer our readers to some standard work upon descriptive geometry.

By means of the construction presented in Fig. 1 we will endeavor to explain the principles of projection as given in the fourth paragraph. To do this we have taken the projection of a line oblique to both planes of projection, and we have to find the true length of the line in space. As given in the textbooks of geometry, the problem is "to find the true length of a line which connects two points in space given by their projections." Let A *a* and B *b* represent the given points and A B and *a b* the given line, as given in the two planes of projection; and let C D represent the ground line. In the relation of this problem to the subject matter of these chapters we may take the ground line to represent the spring line, the line *a b* to represent the elevation, showing the inclination of one edge of the plank, as given in the elevation of a circle on circle arch. The plan of the edge of the plank is represented in the line A B of the horizontal plane.

Now to find the true length of the line we proceed as follows: Square with A B draw A G and B H; set off the lengths A G and B H equal, respectively, to that given in J *a* and B *b* above. Draw the line G H, which will be the true length of the line.

The construction just made is called "development by transposition" and is the only form of development applicable in treating of planes, the true area of plane figures and straight lines. The true length of the line has been found by simply revolving the line itself into the horizontal plane; the points *a*, *b* revolve in arcs whose planes are perpendicular to the axis A B, and after revolution will be found at distances from the axis equal to their true distances above the horizontal plane. These true distances are equal to the hights of the vertical

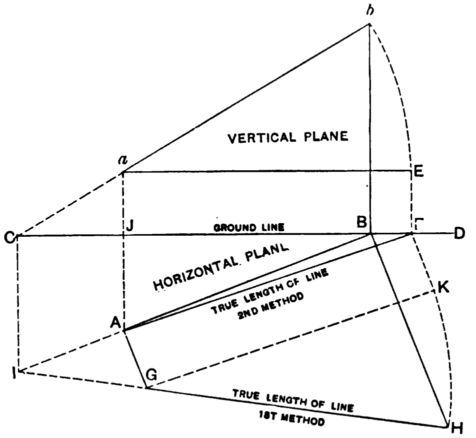


Fig. 1.—Diagram Illustrating Principles of Projection When Projections are Oblique to Ground Line.

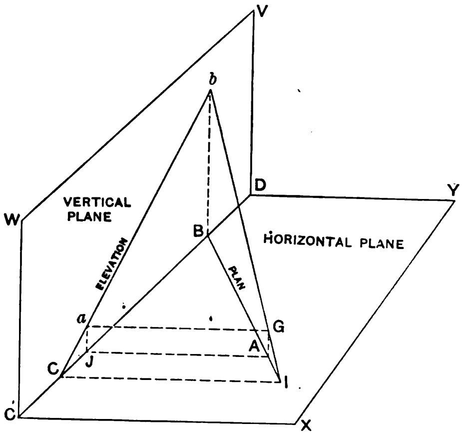


Fig. 2.—Diagram Showing Planes of Projection at Right Angles to Each Other in Space.

Centers for Arches of Double Curvature.—I.

projections of the points (*a*, *b*) above the ground line, which line we may conceive to be simply the elevation of the horizontal plane which contains the axis. The points being perpendicular before the revolution, they will be so after revolution also.

A very practical illustration of this problem may be had in the following manner: Cut a piece of cardboard to the shape as given in A B H G; place this vertically over the axis A B; now revolve the model around A B as on a hinge until it meets the paper—that is, until it lays upon the drawing. This is just what we have done with the line, for the line is represented in the top edge of the model. Now again place the model vertically over A B. The student will in a moment see that the true length of the line is not given in the lines drawn at either plane of projection; that the points *a*, *b* stand vertically over the points A B of the horizontal plane, and at a hight from that plane equal to that shown in J *a* and B *b* of the vertical plane. As stated above, the planes of projection are at right angles to each other in space. This point will be understood from an inspection of Fig. 2, in which diagram C′ W V D is taken to represent the vertical plane, C′ X Y D the horizontal plane of projection and C′ D as the ground line. Letters of reference correspond to those given in the corresponding projections of Fig. 1.

We have in the diagram shown another method for finding the true length of the line: With the point *a* as center and *a b* as the radius describe an arc, *b* E; then parallel with the ground line draw *a* E; then square with the ground line draw E F. Drawing A F gives the true length of the line. The line in this operation has been revolved into a plane, as *a* E, parallel with the horizontal, and from principle 2 above we are taught "that a line parallel to either one only of the planes of projection, its projection on that plane is equal and parallel to the line in space, and its projection on the other plane is parallel to the ground line." Understanding this principle, we are enabled to apply its truth to the solution of the problem in question, for on trial the student will find the length A F to equal that given in G H.

We may with truth remark that the whole secret of, or key to, the correct solution of the many intricate problems which are met with in actual practice by the workman consists simply in having a thorough understanding of the principles of geometry.

◆◆◆

A Light Steel Roof.

A roof of steel designed principally to shelter machinery and supported on steel columns without wall inclosure has recently been built in New York City and shipped to Porto Rico for a sugar company. It was L-shaped in plan, with one wing 96 x 216 feet and one 120 x 144 feet, united so as to make two 216-foot faces and containing one 48 x 72 feet central open court. According to the *Engineering Record* the roof of corrugated iron on wooden purlins was designed to carry only its own weight and a wind pressure of 40 pounds per square foot of vertical projection. The columns are in longitudinal and transverse rows, respectively 24 and 48 feet apart, and in all cases extend to the top chords of the trusses, thus securing deep connections to afford stiffness against wind stresses. Exterior columns are 25 feet long and are made of pairs of 6-inch, 8-pound channels latticed, the interior columns, 37 feet long, are made of pairs of 7-inch, 9¾-pound channels latticed, or of pairs of 8-inch, 11¼-pound channels latticed. The tops of exterior columns are connected by lattice girders 24 feet long and 5½ feet deep, with the top flanges made of pairs of 3 x 2½ x ¼ inch angles, and the bottom flanges of pairs of 2¼ x 2¼ x ¼ inch angles.

All roof trusses are of 48 feet span and have their principal supports at the top chords with pairs of vertical connection angles riveted to the column webs. The extensions of the lower chords are supported on shelf angles on the columns. The bottom chords of the monitor trusses are made of pairs of 8-inch, 11¼-pound channels. In all other trusses the bottom chords are pairs of 2½ x 2½ x ¼ inch angles and the top chords do not exceed pairs of 4 x 3 x 5-16 inch angles. The web members of all trusses are pairs of 2¼ x 2¼ x ¼ inch angles, all rivets are ⅝-inch and all field connections are riveted. All trusses were shipped in two completely riveted halves.

◆◆◆

Cheap Houses in England.

For a long time past the problem of how to build houses representing the minimum of cost and the maximum of comfort has been the study of many in and out of the architectural profession, and the solutions which have been reached have in many instances been both interesting and instructive. An operation tending to illustrate what may be done in this direction embraces a number of cottages erected by the Belmont estate at Chapeltown, a few miles from Sheffield, England. The cottages erected were intended for occupancy by the working classes, and thus far 84 dwellings have been completed. Each house has a back yard and a garden at the front. Between each block of four houses is a passage 10 feet wide, so as to give ready access to the rear. Each kitchen measures 13 x 12 feet and each scullery 12 feet by 10 feet 6 inches. Under the stairs leading from the scullery to the bedrooms above is placed a pantry. On the first floor are two bedrooms, one 13 x 12 feet and the other 6 feet 6 inches by 10 feet 6 inches. Above is an attic 15 x 12 feet. The scullery, kitchen and bedrooms are 9 feet high and the attic at its highest point is 8 feet 6 inches.

All the walls are 9 inches thick, with the exception of that dividing the bedrooms on the first floor; in that case the width is 4½ inches. Each house is provided with a set pan and sink, gas and water. The front has a square bay window, and a veranda of ornamental tiles. The gardens are 11 x 13 feet, and in some cases are bright with plants. The bedrooms have a double window with a brick mullion in the center of the two windows. There is no bath. The outbuildings comprise a coal place for each house, an ash pit for each set of four, and a closet for each couple of houses.

The cottages have been built and sold by G. H. Dowson, a member of the Wortley Rural District Council, for £158, including the cost of freehold, and they rent for 5 shillings per week. At Featherstone Mr. Dowson has built 100 houses in a similar style, but these have no gas, as it costs more than twice as much as in Sheffield.

◆◆◆

A Building Entirely Without Wood.

There is at present nearing completion in the city of Bridgeport, Conn., a building which is unique in the fact that it contains no wood whatever and which will be when finished as nearly fire proof as it is possible to make it. It is constructed on the cantilever plan and is supported by foundations of great strength. The walls are of concrete, the floors are of a composition which is fire proof, and the doors, window sills and frames are of metal. The staircases are of the winding type and are made of concrete. The structure is attracting much attention on the part of engineers and insurance men by reason of the fact that the building will be absolutely devoid of wood and that every feature of construction has proved its value, there being no methods employed that are experimental.

◆◆◆

The general contract for the erection of the new building at Nos. 20, 22 and 24 Vesey street, New York City, which is to be occupied by the *Evening Post*, has just been awarded to Marc Eidlitz & Son. The structure will be 13 stories in hight and, in addition to the various printing departments, will be devoted to offices and lofts. The drawings were prepared by Architect Robert D. Kohn of 170 Fifth avenue, New York City, and work upon the structure will be commenced as soon as weather will permit in the spring.

A country school in Iowa is to be built with the windows on the south and west sides and the blackboards on the north. This is expected to do away with the bad cross lights which are in most schoolhouses.

LAYING AND FINISHING HARDWOOD FLOORS.*

BY FRANK G. ODELL.

THE floor being laid and due care exercised to protect it from injury, we are now ready for the final work of the carpenter. This is where we lock the doors, deny ourselves the privilege of visitors and settle down to the real business which has involved so many painstaking preliminaries. Just a friendly caution here; you are not ready to finish the floor until everything else is done which is possible. See that all mantels are set and tile hearths laid; all plumbers and furnace men out of the way; all doors and windows hung and hardware screwed in place; shelves, closet hooks, cupboard fittings and all the numerous odds and ends which consume time and cause running about the house safely out of the way; all inside wood work on and finished, up to the last coat of varnish, the shoe for baseboards fitted and ready to nail in place; all holes for hot and cold air registers cut to exact size; all picture moldings up; in fine, everything done so completely that you can turn the keys over to the painter with the certainty that the carpenter will not have to return. In such a case you are ready to finish floors, and in most cases the painter will have sufficient pride in his work to properly care for the good job you have left for him.

Preliminary to Finishing.

It is immaterial where you begin if a good exit is assured. There will be a work bench, tool chests and a few hundred scraps to move as you reach the last room; be sure that you can get them out of the house to stay, without tracking over the floor already finished. Sweep everything clean and provide plenty of sharp tools. If the floors have been traveled over to any extent there will be particles of sand and other rubbish ground into the surface which do not tend to sharpen tools. Go after them with a common cabinet scraper drawn quartering across the boards. When you hear something say "click," stop and get it out of the way. If you don't get them this way you are certain to get them with a sharp plane or scraper, to your discomfort. The sand being removed, and carefully swept out of the room (use a 10-cent whisk broom and a sheet of sandpaper for a dust pan), we are ready for the plane and scraper.

Don't forget at this precise juncture to round up the "gang" again and get all shoes cleaned up both as to nails and dirt. Gymnasium slippers or soft shoes of some sort are very desirable, as ordinary leather is very likely to leave dirty streaks after the wearer.

Of course, it costs money to buy shoes, but it will pay the "boss" to give the boys a little bonus in the way of extra pay if they will provide clean soft shoes when they work on the floor. When the comfort of wearing something of this sort is experienced it will not be necessary to suggest it on future jobs. Most of our workmen have gymnasium shoes in their chests ready for any special job requiring clean feet, and consider the dollar as well spent as if used for any other necessary tool.

If the job is properly specified it will be necessary to put a cabinet finish on the floor. This means that every evidence of machine work must be removed and an entire new surface left for the painter. No machine has yet come under our observation which will do work equal to hand finish. If the floor be well milled and evenly laid the scraper will do most of the work. Use a scraper with a handle and get one that "pulls" rather than one that "pushes." Ordinary cabinet scrapers heat quickly and blister the hands, beside being of too light steel to be serviceable on the floor and exceedingly difficult to which to fit a handle.

It is about at this stage of the proceedings that the "boss" begins to lose money. The average workman has not had sufficient practice in what the Salvation Army terms "knee drill" to take kindly to exercise of this sort and gets tired early in the game. Herein lies the value of having about two men to the room, as there is a smaller number to visit when resting time comes and it comes frequently in this kind of work. It is possible, however, to mitigate the hardships of toil by frequent changes of position which rest the knees and back. We are not partial to knee pads, cushions, &c., calculated to soften the floor for the toiler. The writer is not too old or too prosperous to get on the floor with "the boys," and it is the result of our observation that the man who is filled with the proper spirit of hustle is too busy to be dragging around a sack of shavings as a cushion for the southern end of his anatomy.

Should the floor be very rough, as often happens with Southern pine, it may be necessary to traverse it with the jack plane to level the surface, using a quartering stroke to avoid tearing the grain. A trip once over it with the smooth plane will then put things in good shape for the scraper. Traversing is often a time saver and always results in a much more level surface if it be carefully done.

The final finish and the amount of labor to be put on is determined entirely by the character of the job. Should the room be one to be covered with rugs, leaving only an exposed border, the task will be an easy one, as the center can be cleaned quickly with the plane to leave an even color. Rooms requiring the entire surface exposed should be finished to the smoothness of fine furniture, carefully scraping out all rough places and bearing in mind always that every defect will show up through the polish. Be especially careful to avoid a wavy or ridged surface caused by uneven scraping or "chattering" of the tool, and clean out all plane marks carefully. I have never yet met the man who could plane a board as smoothly as the scraper will finish. Much trouble with the plane may be avoided by slightly rounding the corners of the bit when sharpening. The same holds true of the scraper, but on the latter tool the round should be barely perceptible—just sufficient to keep the corners from scratching.

The reader will pardon me for talking as if to amateurs or a class of students in a manual training school. The fact is that some few hundred fairly good mechanics who have come under my personal observation have yet to learn some of the fundamentals in tool sharpening, and this may meet the eye of some such, who will take these elementary suggestions as kindly meant.

The scraper should be invariably worked lengthwise of the board (except in case of badly cross grained stuff) and more rapid and satisfactory results will be secured by pulling the tool slightly quartering. The Starrett "Universal" is particularly neat of adjustment in this particular, owing to its ball and socket joint.

The Final Smoothing.

For the final smoothing nothing is more rapid and effectual than steel wool, followed by No. 1½ sandpaper for pine, and No. 1 for the hard woods. Use No. 3 steel wool and be sure and get the home product, which bears on the label, "Steel wool No. 3. Made in the United States."

This particular brand is emphasized because there is a similar article "made in Germany," which is far inferior and sold at the same price. The American wool has no equal for smoothing quality. Fifty cents' worth will smooth 1000 square feet of floor. Take what may be comfortably held in the hand and rub it with a turning motion, quartering across the board, finishing with a lengthwise motion, and look out for splinters, for it is rare stuff to get into the fingers and hard to get out. This may be profitably followed with sandpaper if a specially smooth job is desired, though a good job, quite up to the average, may be secured with the steel wool alone. For cleaning up dirty floors which have been soiled before the painter reaches them it has no equal, and it is equally good in cleaning plaster stains and other dirt off wood work.

Steel wool should be frequently turned over when using, in order to present a new cutting surface to the board. It cuts on the same principle as a package of miniature knives, and when used with discretion will do its work with wonderful rapidity and leave a fine gloss

---

* Continued from page 7, January issue.

on the surface, owing to the smoothness with which it cuts.

Because of the fact that steel wool cuts more like a plane than sandpaper, it is important that it be followed with a finer grade of sandpaper than would be used were the finishing to be done with sandpaper alone.

The Painter's Work.

Everything in the way of finishing results depends on this craftsman. While he cannot produce a satisfactory job without good carpenter work, he has it in his power to ruin the entire job by using unsuitable materials or by careless use of good ones. There are some few fundamentals in the matter of materials which it is well to emphasize:

1. Never use a liquid filler on a floor.

2. If a filler be required, always use a paste filler and give preference to that made by some manufacturer making a specialty of floor finishes.

3. Always use the filler in the manner specified on the original package without change or adulteration; it is only fair to the manufacturer to assume that he knows his material better than you, and it should be used according to his directions.

4. If a varnish finish is specified never use an inferior varnish for a first coater, expecting to get satisfactory results.

5. If stains are used stick to alcohol stains or "wood dyes," so called. They are more quickly and smoothly applied than either oil or water stains and cost little, if any, more, while the results are more permanent and the imitation of the desired wood is usually better.

6. Never under any circumstances use shellac on a floor. (Here's where we get into a row with about 90 per cent. of the painting fraternity, but the reasons will be given in due time.)

7. Do not use varnish on kitchen, bathroom and other floors requiring frequent scrubbing; it will not stand the racket. No exceptions in favor of anybody's floor varnish, manufacturers' claims to the contrary, notwithstanding. Avoid wax on such floors for the same reason. If recourse is had to hot linseed oil preparations give ample time to dry hard, for they are the greatest dust and dirt traps in the world when not thoroughly dry. Look out for fluid waxes, &c.; they may be good stuff in the can, but are risky material for floors.

After this wholesale warning it will be necessary to specify some finishes which may be used on floors with safety. We will first take floors requiring only a brush finish. For floors requiring scrubbing boiled linseed oil put on hot is an excellent finish, but must be given ample time to dry hard between coats and must not be exposed to wear until absolutely dry and hard, for reasons given above. A better finish for these floors is Johnson's No. 1 Floor Finish. This is made especially for floors requiring scrubbing and is the best preparation we have ever used. It dries quickly with an orange color, and a second coat can be applied the same day. When dry it is very hard and its wearing qualities are unsurpassed. It has the additional advantage of being very fluid and does not show brush marks readily. I think that a fairly good job could be made by spreading it with a broom in the absence of a brush, though I do not recommend a broom for this particular purpose.

(To be continued.)

Convention of National Association of Cement Users.

WITH a view to placing itself on a business basis through incorporation and to inaugurate an investigation of cement and allied products by the United States Government were important features, aside from interesting and valuable papers and discussions, of the second annual convention of the National Association of Cement Users at Milwaukee, January 9 to 12, inclusive. The report of the Executive Board contained a recommendation that the association be incorporated in the District of Columbia, under the laws of the United States, which action met the approval of the members assembled, and the charter drafted by the board was accepted. The object of the organization, as set forth, is to disseminate information upon and promote the best methods to be employed in the various uses of cement by means of conventions, the reading of papers and discussions upon subjects relating to the materials which enter into the making of cement and the nature of their uses, the examination of machinery and other matters connected with the business.

It is provided that the management of the association should be vested in an executive board, consisting of a president, four general vice-presidents and one vice-president from each of the sections into which the association may be divided. These officers are to be selected by a nominating committee, to be appointed at the opening session of each annual convention by the president, with the exception of the sectional vice-presidents, who shall be named by their respective sections and confirmed by the corporation in a general meeting. This board is to be reinforced by the addition of the five latest living past presidents and they shall take their positions at the last session of the association at which they are elected. The executive board is to elect the secretary and treasurer.

The matter of investigation work was touched upon frequently during the convention and was brought out specifically by President Richard L. Humphrey in his annual address and also in his paper on the "Investigation of Cement Mortars and Concrete at St. Louis." The work begun at St. Louis during the fair has emphasized the need of further experimentation with concrete materials and particularly their application to reinforced concrete structures. The following resolution was adopted in this connection and members were urged to take the matter up with their Congressmen, looking toward an initial appropriation by the Government of $100,000 for the carrying on of this work:

Resolved, That we, the National Association of Cement Users, in convention assembled at Milwaukee, deem the investigation of cement, mortars and other structural materials now being conducted by the United States Geological Survey of such far-reaching importance to the people of the country, that we respectfully ask Congress of the United States to make large provision for the continuance of this important work on a more extensive scale.

For an association just starting upon its second year, the Cement Users' organization has shown encouraging growth. According to the report of the executive board read by the secretary, Charles Carroll Brown, there registered at the first meeting, held at Indianapolis last year, 605 members. The number added since that convention is 174, making a total in the neighborhood of the 800 mark at the present time.

The programme showed the wide field covered by the association. The engineer, the architect, the cement manufacturer and dealer, the contractor, the maker of cement and concrete specialties, the reinforcing metal makers, dealers, and, in short, all men interested in any way in cement, come within the scope. The first paper on the programme, given by Sanford E. Thompson, consulting engineer, Newton Highlands, Mass., on "Concrete Aggregates," was a technical treatise on ingredients entering into the compound to produce the best quality of cement. Mr. Thompson's plan for a clean sand evoked considerable discussion, many present not adhering to this principle and favoring an admixture of clay or other material. A. L. Johnson of the St. Louis Expanded Metal Fireproofing Company, St. Louis, read a paper on "Steel for Reinforcement," using the stereopticon to illustrate work accomplished by his company. This concern advocates a bar with a positive grip and this point brought forth much discussion from users of other forms of steel reinforcement. Particularly when C. A. P. Turner of Minneapolis, read his paper on "Cement in Building Construction," advancing his theories in favor of the plain bar, was the subject lively debated. One of the most interesting papers of the convention was that

of S. B. Newberry, Sandusky, Ohio, on "The Manufacture of Hollow Concrete Blocks." Mr. Newberry described the process of manufacture and suggested tests. He denounced the practice of making blocks in imitation of cut stone. The lack of individuality, the monotony of appearance, the fact that block makers tried to force upon them a certain standard size, were causes, he explained, of the hostility of architects to concrete blocks. Much discussion was heard upon the manufacture of concrete blocks and as a preliminary to the Thursday morning session an experience meeting, led by A. N. Pierson of New York, entered into the various stages of manufacture, including the selection of aggregates, mixing, curing, coloring and other phases of the subject. Another interesting paper was that of J. P. Sherer of Milwaukee, a veteran in the business, on the subject of "Air Tamping and Conveying Concrete Blocks," who described at length the methods employed in his factory. He also spoke of the efforts being made in Milwaukee to secure better city regulations in regard to the use of concrete blocks in construction work and referred to the fair and equitable regulations in the city code. A paper was read at the same session by Will J. Scoutt of Chicago, on "Building Regulations of Concrete Blocks."

Other interesting papers were: "The Relation of the Cement Manufacturer to the Cement User," by R. W. Lesley of Philadelphia; "Cement Block Architecture," by Louis H. Gibson, architect, Indianapolis; "Use of Cement and Concrete for Farm Purposes," by S. M. Woodward, U. S. Department of Agriculture, Washington, D. C.; "Manufactured Stone," by J. C. McClenahan of New York City; "The Value of Organization," by I. S. McDonald of Milwaukee; "Manufacture and Use of Concrete Piles," by Henry Longcope; "Waterproofing," by J. L. Mothershead, Jr., Indianapolis; "Causes of Failure in the Concrete Block Business," by O. U. Miracle of Minneapolis; "The Choice of Cement for Concrete Blocks," by Richard K. Meade of Nazareth, Pa.; "Observations on the Testing and Use of Portland and Natural Cements," by E. S. Larned, Boston, Mass.; "Legislation Concerning the Use of Cement in New York City," by R. P. Miller, New York City.

Reports were also heard from the vice-presidents in charge of the various sections. Charles E. Watson of Toronto, vice-president of the section on Art and Architecture, showed in his report that the use of cement for building purposes had already resulted in a better style of architecture. W. W. Benson, vice-president of the section on Machinery for Cement Users, outlined the equipment necessary for the successful manufacture of concrete blocks and showed that most failures were due to a lack of recognition of these principles. E. S. Larned of Boston, who was appointed vice-president of the section on the Testing of Cement and Cement Products to succeed E. D. Boyer of New York City, recommended that the methods of testing of the American Society for Testing Materials be adopted by the Cement Association and copies of the specifications were distributed.

President Humphrey named the following committee on nominations, which reported the list of officers given below, who were elected: R. W. Lesley, Philadelphia; T. L. Condron, Chicago; J. P. Sherer, Milwaukee; C. L. Johnson, Sandusky, Ohio, and M. S. Daniels, New York. The officers chosen, all of whom, with the exception of O. U. Miracle of Minneapolis, who succeeds H. C. Quinn of Dublin, Ga., are re-elections, are as follows:

President, Richard L. Humphrey, Philadelphia, Pa.
First vice-president, Merrill Watson, New York.
Second vice-president, J. H. Fellows, Scranton, Pa.
Third vice-president, O. U. Miracle, Minneapolis, Minn.
Fourth vice-president, A. Monsted, Milwaukee, Wis.

Vice-Presidents in Charge of Sections.

Streets, Sidewalks and Floors, W. W. Schouler, Newark, N. J.

Reinforced Concrete, C. S. Hall, Louisville, Ky.

Concrete Blocks and Cement Products, M. S. Daniels, New York.

Art and Architecture, Charles E. Watson, Toronto, Canada.

Testing of Cement and Cement Products, E. S. Larned, Boston.

Machinery for Cement Users, W. W. Benson, New York City.

Laws and Ordinances, H. C. Henley, St. Louis, Mo.

Fireproofing and Insurance, A. L. Johnson, St. Louis.

The secretary and treasurer of the association are appointed by the Executive Board.

Invitations were received from eight cities for the 1907 convention, with Chicago as the favorite. The cities are Chicago, Buffalo, Columbus, Toledo, Detroit, Jackson (Mich.), Minneapolis and Norfolk, Va.

Thursday evening the association was guest of the cement interests of Milwaukee and the local committee at the Builders and Traders' Exchange and Builders' Club Building.

One of the most important features of the convention was the display of all sorts of machinery and materials for cement and concrete construction. The exhibits occupied space not only in the West Side Turner Hall, the seat of the convention, but in the Freie Gemeinde Hall, a few doors distant. Following is a list of those represented:

CEMENT MANUFACTURERS.

Atlas Portland Cement Company, New York.
Castalia Portland Cement Company, Pittsburgh, Pa.
Chicago Portland Cement Company, Chicago.
Edison Portland Cement Company, New Village, N. J.
Illinois Steel Company (cement department), Chicago.
Marquette Portland Cement Company, Chicago.
Newaygo Portland Cement Company, Grand Rapids, Mich.
Pennsylvania Cement Company, New York City.
Sandusky Portland Cement Company, Sandusky, Ohio.
Western Portland Cement Company, Yankton, S. D.

CONCRETE MACHINERY MANUFACTURERS.

Anchor Concrete Stone Company, Rock Rapids, Iowa.
Automatic Building Block Machine Company, Jackson, Mich.
Barker & Nighswander, Toledo, Ohio.
Berthelet Construction Company, Milwaukee, Wis.
Burnham Cement Brick Machine Company, Milwaukee.
Cement Machinery Company, Burlington, Iowa.
Cement Machinery Company, Jackson, Mich.
Century Cement Machine Company, Rochester, N. Y.
Dever's Cement Works, Cassopolis, Mich.
Hartwick Machinery Company, Jackson, Mich.
Hayden Automatic Block Machine Company, Columbus, Ohio.
Ideal Concrete Machinery Company, South Bend, Ind.
Iowa Building Block Machine Company, Waterloo, Iowa.
T. M. LeHew & Son, Warsaw, Ind.
Miracle Pressed Stone Company, Minneapolis, Minn.
Harmon S. Palmer Building Block Machine Company, Washington, D. C.
Peerless Brick Machine Company, Minneapolis, Minn.
Perfection Block Machine Company, Minneapolis, Minn.
Pettyjohn Company, Terre Haute, Ind.
Reading Brick Machinery Company, Reading, Ind.
E. W. Seamans Company, Grand Rapids, Mich.
J. A. Sodestrom, Sac City, Iowa.
South Bend Machine Mfg. Company, South Bend, Ind.
Standard Sand & Machine Company, Cleveland, Ohio.
White Cement Machine Company, Jackson, Mich.
Winget Concrete Machine Company, Columbus, Ohio.

CONCRETE MIXERS.

Eureka Machine Company, Jackson, Mich.
International Fence & Fireproofing Company, Columbus, Ohio.
Knickerbocker Company (Coltrin mixer), Jackson, Mich.
Municipal Engineering & Contracting Company, Chicago.
T. L. Smith Company, Milwaukee, Wis.
Standard Machine Company, Kent, Ohio.

GAS ENGINES.

Fairbanks, Morse & Co., Chicago.
New Way Motor Company, Lansing, Mich.

PAINTS AND WATER PROOFING.

Ricketson Mineral Paint Works, Milwaukee, Wis.
Sanitary Chemical Company, Indianapolis, Ind.

POST MACHINES.

C. L. Catherman, Elkhart, Ind.
Indestructible Post Company, Chicago.

REINFORCED STEEL.

American Bar-Lock Company, Philadelphia, Pa.
Northwestern Expanded Metal Company, Chicago.
St. Louis Expanded Metal Fireproofing Company, St. Louis.

STONE MACHINES.

T. O. Eichelberger Company, Dayton, Ohio.
Standard Stone Company of America, New York City.

SUPPLIES.

Stevens Cast Stone Company, Chicago.

TANKS AND CISTERNS.

Dever Cement Tank & Silo Company, Cassopolis, Mich.
Simon L. Dunlap, Indianapolis, Ind.

WHEELBARROWS AND CARS.

Chase Foundry & Mfg. Company, Columbus, Ohio.
Cleveland Car Company, West Park, Ohio.
Sterling Wheelbarrow Company, Milwaukee.

HOLLOW CEMENT BLOCK RESIDENCE AND OFFICE OF MR. GEORGE J. WOLF, ON FOURTH STREET, ELIZABETH, N. J.

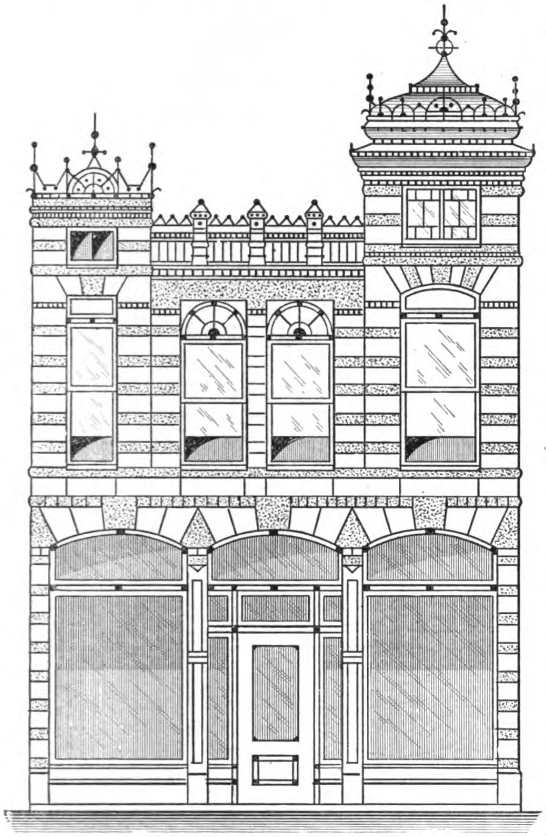
J. A. OAKLEY & SON, ARCHITECTS.

SUPPLEMENT CARPENTRY AND BUILDING, FEBRUARY, 1906.

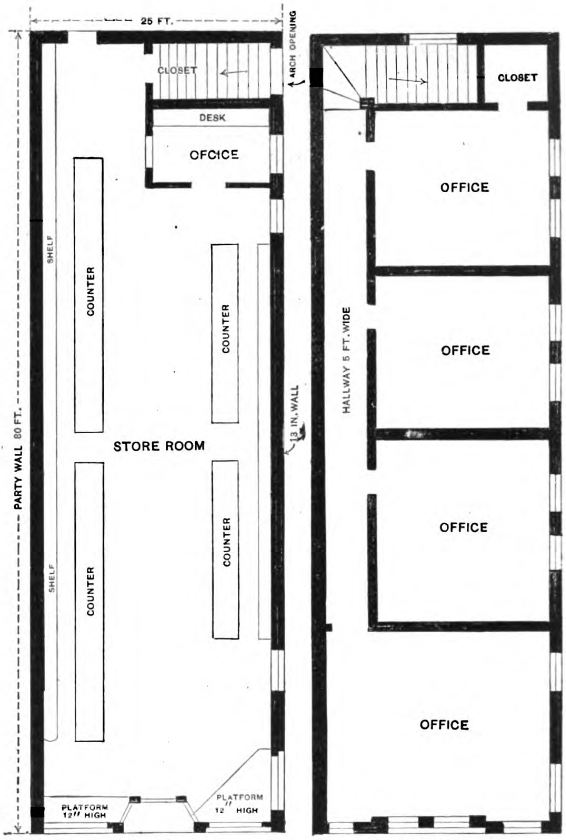
CORRESPONDENCE.

Design for a Store Front.

From W. G., Mumma, *Emporia, Kan.*—Thinking the matter may be of interest to many readers of the paper I am sending the drawings of a store front and of the floor plans to be used in connection therewith. It is intended to be built of pressed brick, red or buff color according to preference, with alternate courses of blue limestone 6 inches thick with five or six courses of brick between. This, I think, will produce a very nice effect, being a combination of color and different materials. The first story is to have a flat glass front, with single door about 4 feet wide and about 8 feet high. The design is intended for a corner lot, with the door on the corner facing both streets. The length of the building may be extended according to requirements, but as shown it is 80 feet. The stairway leading to the second floor is placed at the extreme rear, with entrance from the side street. The floors are intended to be of fir 3 inches wide, resting on fir or spruce joists 12 inches deep by 2 inches thick, placed 16 inches on centers and having two rows of bridging. The roof is to be of zinc or copper, although if preferred a high grade tin might be used. The first story is intended for store purposes, while the second is for offices. The sidewalk in front of the building is to be of cement.



Front Elevation.—Scale, ⅛ Inch to the Foot.



Main Floor. Second Floor.
Scale, 1-16 Inch to the Foot.

Design for a Store Front.—W. G. Mumma, Architect, Emporia, Kan.

The Shingling Question.

From A. E. G., *Cleveland, Ohio.*—I read the article on page 351 of the December issue in regard to shingling and in it the statement is made by " Western Builder " that he laid, split and double nailed 3500 shingles in three hours. I desire to mention the fact that I have been in the shingling business all my life and am considered one of the speediest men in Cleveland, but the most I ever laid in eight hours, with a helper, who was also a good man, was 6500, for which I received $2 per thousand. In our city it is considered a good day's work for a man to lay and nail 2000 in a day. If the man who wrote the article in question can lay 3500 shingles in three hours, or over 9000 a day, send him to Cleveland and he can make from $15 to $20 per day 300 days of the year. I would state that I did the nailing, while my helper laid the shingles. We do not split our shingles, but use them just as they come out of the bunch. I can nail shingles just as fast in comparison as the expert lather can lay lath, and my helper can lay them just as fast as I can nail, so " Western Builder's " statement seems to me to be rather strong.

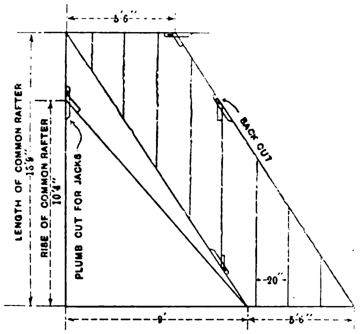
From W. A. B., *Vinita, I. T.*—Having read the columns of the paper for several years I have been greatly interested in the Correspondence Department, but sometimes wonder if occasionally writers do not try to see how big a storm they can raise. If " Western Builder," writing in the December issue, had quit after he had instructed us in his methods of finding short cuts on rafters, &c., all would have been well, but when he struck the shingling question he set my hair. I admire the manner in which " L. H. H." takes him to task, as does " H. S. G." I, too, have had a little experience in this shingling business during the past 35 years, and have been on the roof with a great many men, but I confess I cannot find any of the crack shinglers he tells about. The only thing I can see that lets him out is that little three-cornered perch and hatchet with a pin in it. I have a roof now ready for about 20,000 shingles and I would like to have that hatchet and pin man a couple of days. I will gladly give 50 cents per hour to see him perform. My experience with that class of fellows is that they always get

in their big licks when they are not in the vicinity where there is any work doing in their line.

I desire to say in conclusion that if all the readers of *Carpentry and Building* have received as much benefit from its columns as I have I should think there would be few if any names scratched from the list after they once get there. If I run up against a hard proposition I can generally find something helpful by looking through back numbers of the paper.

Finding Lengths and Bevels of Jack Rafters for Deck Roof.

From S. A. T., *Boyne City, Mich.*—I send inclosed a sketch intended to show "J. A. K.," Detroit, Mich., how I would solve his problem. The sketch so clearly indicates the method as to practically explain itself. To obtain the plumb cut on the hip and valley measure across the angle of the common rafter 9' and 9', which will give the run, while the rise is the same as that of the common rafter. I would suggest to "J. A. K." that care must be taken to allow for the thickness of the hip and valley rafters or else the jacks will be too long. If the method which I portray herewith is not right I hope some of my brother chips will kindly tell me wherein I am wrong, as I expect to frame a large roof of this style the present winter.



Finding Lengths and Bevels of Jack Rafters for a Deck Roof.

Developing a Valley Rafter.

From C. C., *Poughkeepsie, N. Y.*—I would like to have some of the readers show in the columns of the paper how they obtain the shape of a greenhouse valley where the roofs intersect at right angles. That the rafters of one house are on a 4-foot radius at the eaves and the other on a 2-foot radius, while one radius is 3 feet above the other, as shown in the diagram, Fig. 1. I would also like to have them show how to obtain the patterns where a 4-foot radius intersects a straight roof, as indicated in Fig. 2, a cross section of the valley being shown in Fig. 3.

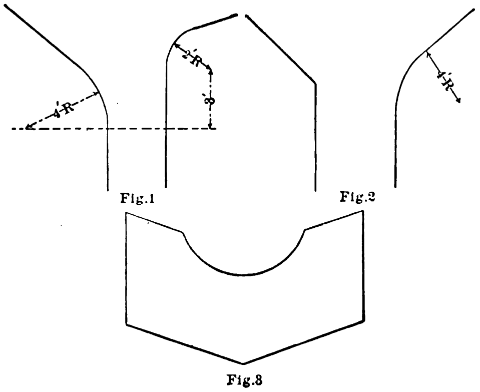


Fig.1

Fig.2

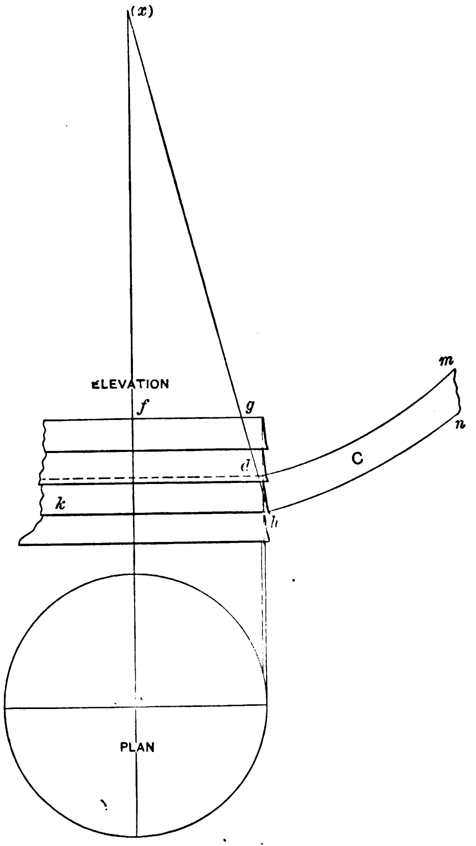
Fig.3

Developing a Valley Rafter.

It is possible that some other readers may be interested in this subject, so that those who reply will be doing a favor to a great number of us.

Weather Boarding a Circular Tower.

From H. I. N., *Atkinson, N. H.*—In reply to the inquiry of "R. J. O'B.," Brooklyn, N. Y., in regard to putting bevel siding on a circular tower, I submit the accompanying sketch, which I will explain for the benefit of the correspondent in question and others of my brother chips who may be interested. The drawing represents a plan and elevation of the circular tower, the siding of which must be worked with curved edges, as indicated at C. In order to find the radius and length of this curve the axial line *e f* is drawn through the center of the tower and extended to *f* indefinitely. The line *h g* is then drawn as a continuation of the direction of the slanting surface of the siding and carried out until it intersects the center, or axial, line, *e f*, at *x*. Now with *x* as a center and radii equal to *x d* and *x h* describe the arcs *d m* and *h n*, which will give the form and curvature necessary to secure the level lines on the top and bottom of the siding after it is bent around the tower in the position indicated by *h k*. If the correspondent will make a full size drawing on the floor or any place where he has room and follow the above directions he can cut the form *d m n h* from heavy paper, using it as a pattern. The curves can then be traced on each strip of siding and worked out with draw knife and plane. There are a number of ways of doing this work, but I think the plan here described is the easiest, although if any other chip has a scheme which he considers better I hope he will send it to the editor for publication, as there are none of us too old to learn.



Weather Boarding a Circular Tower.

From E. F. C., *Bremen, Ind.*—I am neither a carpenter nor a builder, yet I am a subscriber to *Carpentry and Building*, and am pleased to say that I learn a great deal

from the columns of this valuable magazine. In reference to the question asked by "R. J. O'B.," Brooklyn, regarding a rule or method for describing the proper curve for bevel siding on a conical shaped tower, I offer the following suggestion: The proper way is to draw a sectional elevation of the tower to some convenient scale, or if the slant hight is known—that is, the hight from the base of the tower to a point where the slant line would intersect with a line drawn through the center of the tower—then the distance from the point of intersection on the slant line to the base line would be the radius for striking the curve to which the boards for the courses should be cut. If the boards are exposed 4 inches to the weather, then the second course is cut to a radius 4 inches less than the first course; the third course is cut 8 inches less, and so on until the top of the tower is reached, always deducting 4 inches for the next course.

Rapid Methods of Shingling.

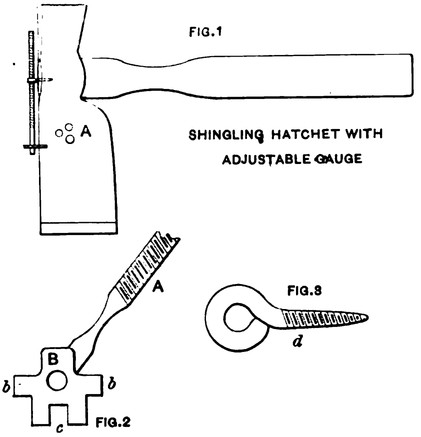
From WESTERN BUILDER.—The request of the correspondent from Cedar Falls, Iowa, in the January issue, for a more complete description of the devices for rapid shingling referred to in the December number of *Carpentry and Building* has been duly noted, and I inclose sketches with some particulars which may prove of interest to him as well as others in the trade. The sketch, Fig. 1, shows an ordinary shingling hatchet equipped with a gauge, the details of which are clearly indicated in Figs. 2 and 3. By reference to Fig. 2 the construction of the gauge will be seen to be both simple and efficient, A representing a screw made of spring wire and flattened in the middle to make it spring with more ease; B is a head of thin steel with projecting ears at *b b*, which engage the butt of the shingle and stop it automatically. The ears being on both sides make the gauge equally convenient for a right or left handed man. The slot *c* slides over the blade of the hatchet and prevents the gauge from moving from its fixed position. The threaded screw eye *d* of Fig. 3 is screwed in the end of the hatchet handle and engages the thread of the rod A of Fig. 1, perfecting the adjustment as to the width of the course. In practice the head of the hatchet is placed against the last course of shingles and the new course laid against the projecting ears *b b*, which automatically gauge the width of the course and hold the shingles in place ready for nailing.

Another form of gauge, consisting of simply three holes drilled in the blade at varying distances from the head of the hatchet and a stove bolt firmly fixed in the hole, which gives the proper distance, is illustrated at A in Fig. 1.

The three-cornered seat for shingling, to which reference was made in the December issue, is illustrated in Fig. 4 and is made of seven-eighths stuff. The three-cornered blocks cut to fit the pitch of the roof are represented at A *a*, while B is a riser and C is the seat. The nails *b b*, driven in both three-cornered pieces, are filed to sharp points and left about ½ inch long. These readily fasten themselves in the shingles without detriment to the roof and make a secure and comfortable seat. With two of these perches, which can be made in a few minutes, one may clamber securely all over a roof without any scaffolding except at the bottom for the first courses.

The method pursued by our rapid professional shinglers is to first open enough shingles for a half day's work and stick them about in little bunches all over the roof so that they are easy to reach. The bottom course is laid to line in the ordinary manner and the roofer then mounts his perch and lays as many courses as he can reach in the one position, usually carrying eight or ten courses across the roof. If there is any serious variation from line perceptible a line is struck to straighten up, and the operation is repeated. In actual practice, however, these expert fellows generally lay a roof as straight with the gauge as the average carpenter does by lining every course. It is easy to understand that the time usually spent in setting foot scaffolding, lining, measuring, &c., to say nothing of the time lost by fast men in waiting for the slow fellow to finish his course so that they can "line up," means a lot when put into steady shingling with every man busy all the time.

I find it somewhat difficult to get carpenters to break away from stereotyped methods and adopt time saving devices of this sort, but when they do so they invariably become enthusiastic over the increased ability to accomplish work, for it generally means the ability to draw bigger pay. I most heartily commend such methods to the craft, for some of us have found that they greatly increase the output of labor without impairing in any way the quality.



Figs. 1, 2 and 3.—Shingling Hatchet with Details of Gauge.

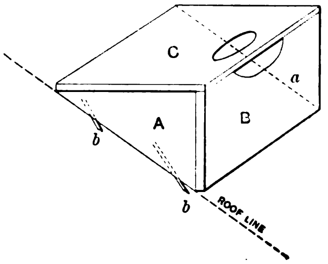


Fig. 4.—The Three-Cornered Seat.

Rapid Methods of Shingling.—Contributed by "Western Builder."

Knots for Tying Sash Cord.

From S. A. T., *Boyne City, Mich.*—I think "Hee H. See" is all right in the position which he takes in regard to various matters discussed, but I shall be glad if he and the other readers of the paper who are interested will now show us how they fasten the other end of the sash cord. If they will do this I will appreciate it greatly, and I have no doubt others will be glad to have the same information. I am deeply interested in *Carpentry and Building* and am endeavoring to promote its material welfare by sending an occasional letter for the Correspendence Department. Other readers can help along the work by doing the same thing.

From S. F. B., *Wellington, Ohio.*—It is more than 35 years since I began tying sash cord and I commenced with a bowline. I have been at it ever since, and the man who cannot tie it cannot hang windows for me. In my opinion, it is the only knot that will hang a weight plumb and keep it there.

Obtaining Patterns for Knives for Tenoning Machine.

From C. C., *Poughkeepsie, N. Y.*—Will some of the woodworkers who have had experience show how they obtain the patterns for knives for a tenoning machine, where the knives cut on a draw?

Converting a Warehouse Into an Opera House.

From C. Powell Karr, *Plainfield, N. J.*—In the issue of the paper for November last "An Appreciative Reader" wanted to know the proper design for a truss to be used on a warehouse building of 65 feet span and with 13-inch brick walls. The correspondent stated that the building is to be converted into an opera house and that the posts, which are the present mode of support, are to be removed and the structure made self supporting by means of roof trusses. The roof is to be one-third pitch and covered with tin or galvanized iron, while the ceiling is to be of stamped steel. He wants to know what would be the design of the truss and if it could be constructed of built-up timbers. He also wants to know if the pitch would be too flat for safety on such a span and if it would be necessary to place pilasters in the walls under the truss seats.

In reply to the questions I would state that it is best to place the trusses at equal distance apart—say 13 feet on centers—thus making four trusses necessary. As the roof is to be one-third pitch and the clear span is 65 feet it would make the rise of a truss 21 feet 8 inches. The type of truss selected is one that will distribute the loads the most uniformly without causing an undue transverse strain on the top member as a beam. This suggestion divides the truss into six bays or panels, each point of intersection being a panel point at which we are to suppose each load is concentrated. In a truss of this kind the camber is generally placed at one-sixth of the hight as the limit of good practice. Any greater camber increases the strains in the truss members.

We have four items to consider in order to arrive at the load to be carried—namely, the roof covering, the snow load, the suspended ceiling and the weight of the truss itself. The roof covering is taken at 20 pounds per superficial foot, measured on the slope of the rafter; the snow load, according to the correspondent's statement, at 5 pounds per foot, the load taken horizontally, and the suspended ceiling at 4 pounds per foot.

To arrive at the approximate weight of the truss itself we use the well-known formula:

$W = \frac{1}{2}\, a\, l\, (1 + 1\text{-}101)$, in which $a = 13$ ft., $1 = 65$ ft., or

$W = 3169$ lbs.

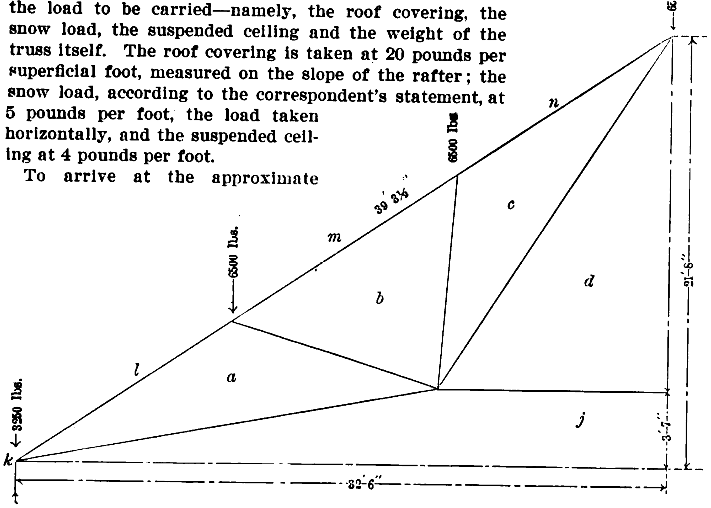


Fig. 1.—Truss Diagram.—Scale, ⅛ Inch to the Foot.

Converting a Warehouse Into an Opera House.

Snow load is obtained thus....65 × 13 × 5 = 4,192

Suspended ceiling thus........65 × 13 × 4 = 3,380

Roof covering thus............20 × 13 × 78.58 = 28,288

Total load..................................39,029 lbs.

or, say, 39,000 pounds. As there are six panels, each panel load will be 6500 pounds, but one of these panel loads is borne one-half by one wall and the other half by the other wall, without exerting any stress upon the truss, so one of the panel loads may be disregarded. At the apex of the truss one-half of the central panel load goes to the left and the other half to the right. The truss is supposed to be symmetrically loaded.

Taking each panel load in order and using a suitable scale (1000 pounds to the inch on a half-inch scale was used in the original drawing), lay off each load in succession on a vertical load line as shown—thus: The distance L M is laid off equal to the load *l m*, or 6500 pounds; then M N equal to the loan *m n*, and so on to the center. Only one-half of the truss is determined, as the two halves are symmetrically loaded.

Beginning with the joint at the left support and using the Bow notation, where the reaction *j k* and the load *l k* are held in equilibrium by the stresses in *l a* and *j a* the polygon representing these forces will also be closed. L A is therefore drawn parallel to *l a* and A J parallel to *a j*. Notice that *j* is the center of the load line, and J A must be drawn from J and L A from L until they meet at the point A. The lengths of L A and J A measured by the same scale used on the load line give the amounts of these stresses in these members. To find B M and A B draw the stress lines parallel to the corresponding members in the truss diagram until they meet at their intersection point, *b*. Measure as before.

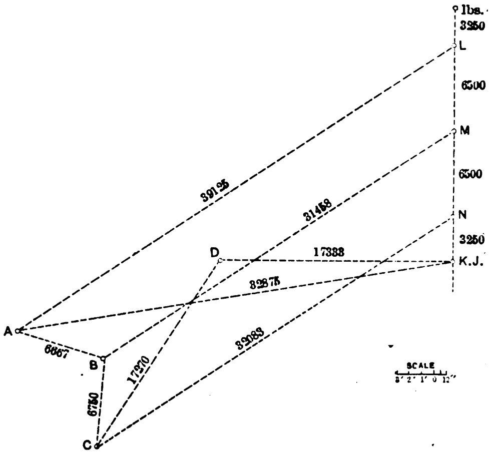


Fig. 2.—Stress Diagram.

The stress diagram shows the stress in each member of the truss calculated in this manner.

By the method of moments or by the method of the resolution of forces, too complicated and involved to introduce here, these results are practically confirmed.

The Bow method of notation is that in which the name of a line or of a force is indicated by the two letters between which the line or force lies. Thus in the truss diagram the horizontal tie lies between *d* and *j* and is therefore called *d j* or *j d*, and on the stress diagram the stress line drawn parallel to *d j* is indicated by the capital letters D J.

As to size and materials, the top chord is to be of wood, and it is desirable to make the section uniform throughout its length. This section must be determined by the maximum strain on the chord at its most heavily strained part, which is of course L A, or 39,125 pounds.

As each panel point theoretically is supposed to be the beginning or ending of a member, we shall consider the top chord to be divided, each side of the apex of the truss, into three parts. Each part as a post has a strain relatively small as to its capacity, but when purlins rest on the chords of the truss between the panel points the chord is subject to a bending strain which must be considered.

It may be said that the actual load on the roof transferred through the purlins to the truss chords is uniformly distributed, and therefore the maximum bending moment is equal to $W\ L/_8$, or $\frac{13{,}000 \times 156}{8}$ is equal to 253,500-

inch pounds, in which W is equal to load in pounds and L is equal to span in inches. If the bending moment on the chord between adjacent panel points be calculated as if for a beam, with ends simply supported, the bending moments at the ends and at the center of the panel for the continuous chord may be taken as two-thirds of the maximum bending moment for the simple beam.

Two-thirds of 253,500-inch pounds is 168,000-inch pounds.

According to the formula laid down by the late Mr. Kidder and in universal use, the bending moment equals the moment of resistance multiplied by the modulus of rupture for safe strength. This modulus for American spruce is 1620.

$$169{,}000\text{-inch pounds} = \frac{B \times D^2}{6} \times 1620.$$

or $B \times D^2 = 626$.

Let $B = 8''$.

Then $D^2 = 78.25$, or D is equal to, say, 9 inches.

Considering the stress in the chord as only that of a post, if we take the section we have just deduced to meet the bending moment due to transverse strain as 8 x 9 inches, we would find the safe load for such a rectangular timber post to be 42,480 pounds. This we see by comparison is in excess of the maximum strain on the top chord and is sufficient to meet the combined transverse strain and the stress of 6500 pounds on each panel point acting as a post, but as allowance must be made for the weakening of the chord by cutting and fittings that have to be bolted to it the depth should be increased to 10 inches, which will give us a working dimension of 8 x 10 inches.

The members *a b* and *b c* receive a stress due to compression only and have a load about one-half that of any section of the top chord. A 6 x 6 inch would be ample, but to insure uniformity and stiffness the piece should be 6 x 8 inches.

The members *a j*, *c d* and *d j* should be of mild steel, as all of them are in tension.

a j has a stress of 32,875 pounds, requiring a round rod ⅝ inch in diameter; *c d* has a stress of 17,270 pounds, requiring a round rod of 1¼ inches diameter, and as *d j* has about the same stress it would require a round rod of 1 5-16 inches diameter. The strength of the steel is taken as 16,000 pounds to the square inch for a safe working load.

The top chord* may be built up of two pieces 4 x 12 inches, blocked together every 5 feet and bolted through the blocking, the block pieces to be 4 x 12 x 8 inches. There should be a cast iron shoe at the bottom of the chord to receive the pull of the tension rods and the thrust of the chord, while at the apex there should be placed an angle block to receive the proper connection for the rods. The horizontal tie rod and the rod *a j* should have a swivel expansion joint to adjust the truss from time to time as may be necessary.

As the reaction at the foot of the truss on the wall is $\frac{39{,}000}{2} - 3250$ pounds, or 16,250 pounds, or a stress of about 113 pounds per square inch, whereas a working stress of 200 pounds per square inch on a good, well laid brick wall, laid up in cement mortar, is allowable, it will be seen that it will be unnecessary to reinforce the walls with pilasters.

The pitch is not too flat for the truss as shown—the flatter the pitch the greater will be the stress on the ties.

Mr. Odell Defends "Western Builder."

From FRANK G. ODELL, *Lincoln, Neb.*—The degree of chastened enjoyment with which the writer views the discussion now raging in your Correspondence columns over shingling and nailing and "averages," may be likened to that with which the veteran member of a fraternity witnesses the initiation of the neophyte. It will be recalled that some months since in a foolish moment I was reckless enough to tell your readers about some fast shingling, door hanging, &c., within the scope of my observation, all of which were actual happenings; not related with any desire for vainglorious boasting, nor yet with any serious hope of materially advancing the efficiency of the journeymen of the present generation. I have known them too long and drawn too many pay checks to their order to entertain any foolish hopes in that direction. My hope was rather to stimulate investigation tending to establish some kind of an average for a day's work, which should be not only reasonable in its requirements and general in its scope, but which should excite emulation in the youthful breast in which hope springs eternal.

Do you remember that letter of mine, Mr. Editor? And do you remember how they "lit on me," from Nova Scotia to Texas, pronouncing your humble servant a lineal descendant of Baron Munchausen? My own recollections are fresh and painful. Nothing like it has delighted the lovers of a scrap until "Western Builder" recently perpetrated a similar bit of foolishness, and now he is learning that the way of the transgressor is hard. They are even figuring out the number of fractional nails he must drive in the fractional part of a fractional second in order to make his tale adjust itself, without allowing the poor fellow time to take a "chaw" or spit on his hands.

Now this becomes a serious matter and, as the original inciter of this disturbance, I am moved to rush to the defense of "Western Builder," even at some risk to myself. The Pharisees of old professed a devout reverence for the traditions of the elders, and I am often tempted to believe that they have some followers among the number of your correspondents. With all due respect for the old ways, I must beg to differ with some of the brethren who seem to think it a ludicrous matter to suggest that the carpenters of to-day should keep pace with other lines of industry in the improvement of their methods of work.

I think that I may fairly hold to this difference of opinion, inasmuch as I learned my trade under these same old methods. The writer is no chicken with spurs uncut, nor an apprentice "kid" who wants to air his freshly acquired opinions. He has grown gray in his trade and for over 20 years has been an employer of labor, possibly having had as wide experience of men and methods under varying conditions as some of those who will see fit to criticise this letter.

What's all this disturbance about, anyhow? Are we as a craft fast or slow, compared with other trades of hand workers at this time? Josiah Allen's wife was wont to expatiate on the value of "mejumness" as an aid to digestion, and it's my opinion that we are generally afflicted with a serious case of that quality. It may be well enough as a retardent, but its value as a stimulant is open to serious question.

Since "Western Builder" brought trouble on himself I have been doing a little investigation along these lines and am moved at this time to give your readers some of the results.

F'rinstance, consider the lather. You all know the man who pounds out a living with his Underhill hatchet. In this country he averages 150 square yards of lathing in a day, carrying in his own lath and rigging his own scaffolding. That's 2250 lath in ten hours (they usually do it in nine here), or about 10,000 nails a day (including nailing in pieces), an average rate of 1000 nails per hour. It's an easy calculation that the real work of nailing is done at twice this speed, or about 2000 nails in 60 minutes—*i. e.*, about 33 1-3 nails per minute (let's have some more fractional calculations)—and he has still time to reach down in his nail sack occasionally for a fresh supply of polished steel.

Now this is not what is called a fast lather. He is just a good average man, and you have all seen him if you have met many real lathers.

We have in this town a mighty decent lather. Willie Jacobs by name (I name him, right out in meeting, to avoid the charge of creating fictional characters), who holds the State record of 216 yards in nine hours, carrying in his own lath and making his own scaffolding. Just figure his speed, some of you good calculators, and please don't forget the fractions.

---

* Tests made of two or three sticks bolted and keyed together showed that they did not behave like a solid pillar, but as if the several timbers acted independently, so that it will be necessary to increase the depth calculated if the chord be built up of two members.

This same Willie Jacobs has done my work for years and it is a common thing for him to nail 200 yards in a day on common residence work. I am particular to mention this for I do not care to have my veracity questioned. About all a contractor can save unimpaired in these days of wage scales and "mejumness" is his veracity, and that should be jealously guarded as a valuable asset, as indeed it is.

Incidentally, Willie Jacobs can shingle some, too, but I dare not go into that matter. "Western Builder" would get a rest at once.

Again and secondly, brethren, let us briefly consider the printer. His average stunt for hand composition the country over is 1000 "ems" per hour, throwing in his case, justifying his lines and correcting his proof. Reduced to intelligible English that means that he handles about 3000 pieces of type per hour and still has time to take a shot at the cuspidor and swap a yarn occasionally about some fellow he once knew who was "fast."

Gee-whiz! Get busy and figure his speed, will you? And please don't forget the fractional parts of seconds.

Now this is not a fast printer at all. It's just any old kind of an average, tobacco chawing, dirty fingered printer, with two suspender buttons missing. The fast compositors are in quite another class and it's not safe to talk about them in present company.

Kindly refrain from questioning my veracity until you look up the facts. "Western Builder" is probably lying to beat the band about that shingling, but I'm "getting down to cases" now, and I want some of you fellows to understand that the average carpenter has nothing to brag of when his gait is compared with some other trades.

Do you mean to say that the lather or the printer is superior to the carpenter in natural intelligence or ability? *Aber nit.* What's the trouble, then, that when some fellow gets a move on himself and it is talked about a little the air is full of visions of mendacity?

I can easily credit "L. H. H.'s" statement that his men will not average 3000 shingles per day. I don't think they will average 2000 per day out here, yet I can introduce the casual caller to some 25 mighty good fellows who can nail on their 500 per hour and do first-class work in that and every other line. Some of them work for me. I can also point out to you some 400 carpenters in the same city who will not average 200 per hour, but could easily do 300 if they would sweat occasionally. Is an increase of 50 per cent. in any given line of work worth anything to an employer? Is 10 per cent?

As to shingling, let me say in passing that my men have used the three-cornered stool and the hatchet gauge a long time and none of them would do without them. So far no one has fallen off the roof owing to the use of the stool, and all say that the comfortable sitting position enables them to always sit easily for nailing and enables them to do faster and better work. Every carpenter knows that a long spell of shingling is likely to cause piles or hemorrhoids, and nothing is a better preventive of this distressing disease than the three-cornered perch when you go on the roof.

I wish in all seriousness that a definite and continued effort might be made by the readers of *Carpentry and Building* to ascertain practical methods of increasing both the quantity and quality of our output; and above all, to determine some sane and safe basis of estimating labor cost in our trade, if such a thing be possible. It is clearly evident that methods of a decade ago are obsolete so far as estimating is concerned, and we must adjust ourselves to new conditions. Certainly great improvement is indispensable if wages are to be kept up to the level demanded by the present high cost of living. I seriously question if the contractor anywhere is making a legitimate margin of profit from his business commensurate with the risks involved and the ability required. This deficiency is due largely to the uncertainty of the labor cost. Materials are a factor easily determined from price-lists, but who shall say what amount of labor will be produced from a definite number of hours at a given wage scale?

I respectfully submit, as a patent fact of common knowledge, that there is no soul overpowering ambition tearing a hole through the breast of the average carpenter in an effort to make himself worth a dollar a day more to his employer. I am also in doubt whether the general disposition which appears to be manifest to laugh this discussion out of court will be profitable to either employer or journeyman.

I live in a town where the wage scale is 32½ cents per hour. It is complained of us and with some justice that wages have always been too low in our town and that the fault lies with the employers; yet I will undertake to go out right now in the dead of winter, when jobs are not plenty, and find employment for men who can earn 50 cents per hour more easily than employment can be found for those who are content to keep themselves in the 25-cent class. For this, as for some other things, there must be a reason. Guess it.

Short Cuts in Estimating Heating Work.

From R. B. M., *Altoona, Pa.*—In view of the discussion that has occurred in the past on estimating in building construction and the attempts that have been made at "short cuts" in reaching conclusions it may not be without interest to refer somewhat briefly to my own experience in this direction in connection with the heating and plumbing of a building. When I first started to do steam and hot water heating work, after having had considerable experience with plumbing work, using wrought iron pipe for the water service, I thought that I could lump some parts of the work so far as the estimates were concerned and save myself much tedious work. I did not know that I was making a mistake as to my cost until finding my funds becoming somewhat cramped I commenced to look for the cause of the trouble. I had expected the profit from a $1,000 steam heating contract to pay for some new shop equipment, but unfortunately at the end of the month my bank balance, even with this deal included, would not allow me to settle the bills which had already been contracted. Having closely superintended the installation of the piping and the other work I was in a position to go over it in my mind, when I found that it cost me a great deal more than I had estimated. I then went over the estimate to see where the error had occurred. I found that I had omitted a valve or two, some runs of pipe with the fittings and one small radiator; also that I had not estimated the time for the work, partly due to the fact that the piping had to be run differently from what I had originally expected and partly because the job could not be completed all at one time and had to be taken up four different times before it was finally completed. I also found that I had not included some of the expenses for special service incurred by some of the goods not arriving in the same shipment with others. This led me to look into the percentage which I charged for replacing shop tools, rent, interest, clerk hire, horse and similar things which have to be paid and come out of the money received for a contract whether they are included in the estimate or not.

I have never followed the suggestion of keeping an account of the cost to verify the estimate, but have arranged to do it on one or two later contracts on which I am now working. I feel, however, that I have followed the tedious method of making up estimates long enough to have a pretty good idea of the cost in general, and think I could apply short cut rules with a reasonable amount of confidence in avoiding a loss. Hope that those who have such rules, whether in reference to computing the time for a given work or the total cost by the number of radiators or by the space to be heated, will send them in, so they can be printed for the benefit of other readers as well as myself.

Details of Bathroom Trim.

From ARCADIAN, *Wis.*—Will some kind reader of the paper forward for publication details of bathroom trim, showing width of base and style of molding to be used above the tiling? To what hight should the tiling be carried, and what kind of shelves and towel racks would be appropriate in a room of this kind?

WARMING AND VENTILATING A SCHOOL BUILDING.

THE gravity system of furnace heating has been advantageously used to heat school buildings under the laws existing in Massachusetts, New York and Pennsylvania, and by reason of the low cost of installation, as well as the low cost of maintenance and moderate use of fuel, is well adapted to the needs of the smaller school building. The laws referred to demand a supply of 30 cubic feet of fresh air per minute per pupil, which necessitates delivering a large amount of air at a comparatively low temperature, and consequently the flues must be of ample size and the furnaces so arranged that a wide space is left between the castings and the brick work surrounding them. At the same time, in order to reduce the cost of ventilation, provision is usually made for operating it as a rotary one during the hours when school is not in session.

In the new school building recently built in Pelham, N. Y., a heating system of this character has been installed under designs of Fuller & Warren Company, 1133 Broadway, New York, and at present is operating satisfactorily. The arrangement of the building as well as the layout of the heating apparatus is shown in the accompanying plans, the basement plan, Fig. 1, showing the location of the furnaces, coal air duct and warm air flues as well as the return ducts, fuel room and general arrangements. On the first floor, Fig. 2, are the two class rooms as well as the teachers' room and hallway. The second floor, Fig. 3, is not unlike the first, except that there are but two class rooms and a hallway. Compactness of arrangement is a desired feature, and it will be readily seen, says C. T. Richards in a recent issue of *The Metal Worker, Plumber and Steam Fitter*, that in the present arrangement it is decidedly easy to operate owing to the fact that the firing room is directly between the fuel room and the furnaces themselves, leaving a short passage so that the janitor can readily turn around when firing.

The air used for ventilating purposes is heated from 10 to 70 degrees, or through a range of 60 degrees. Each class room accommodates 50 pupils, necessitating a supply of 90,000 cubic feet of air per hour; therefore if this be multiplied by 1.09 (the number of heat units required to raise 1 cubic foot of air 60 degrees) the 98,100 heat units obtained is the amount required for this purpose. The wall exposure and glass surface of each of the four class rooms are practically identical, being made up of 125 feet of exposed glass surface and 435 feet of net wall surface. The engineer who planned the work states that the air is delivered at the registers at a temperature of about 125 degrees. It can be readily shown that the stated supply of air at this temperature will make up for all the transmission losses and maintain the room at a temperature of 70 degrees, when the thermometer outside is 10 degrees above zero. Multiplying the 125 feet of exposed glass surface by 60, the number of heat units lost through 1 square foot for the 60 degrees temperature range, gives 7500 heat units lost through the glass surface. Multiplying the 435 square feet of wall surface by 20, the amount of heat lost per square foot of brick wall 16 inches thick at an inside temperature of 70 degrees and an outside temperature of 10 degrees above zero, gives 8700 heat units lost through this source. The air supply is, of course, allowed to escape to 70 degrees, so that the 98,100 heat units calculated must be added to these heat losses. The total is thus 114,000. When the outside temperature falls below 10 degrees above zero the additional heat units can be supplied by forcing the fire and raising the temperature of the entering air to

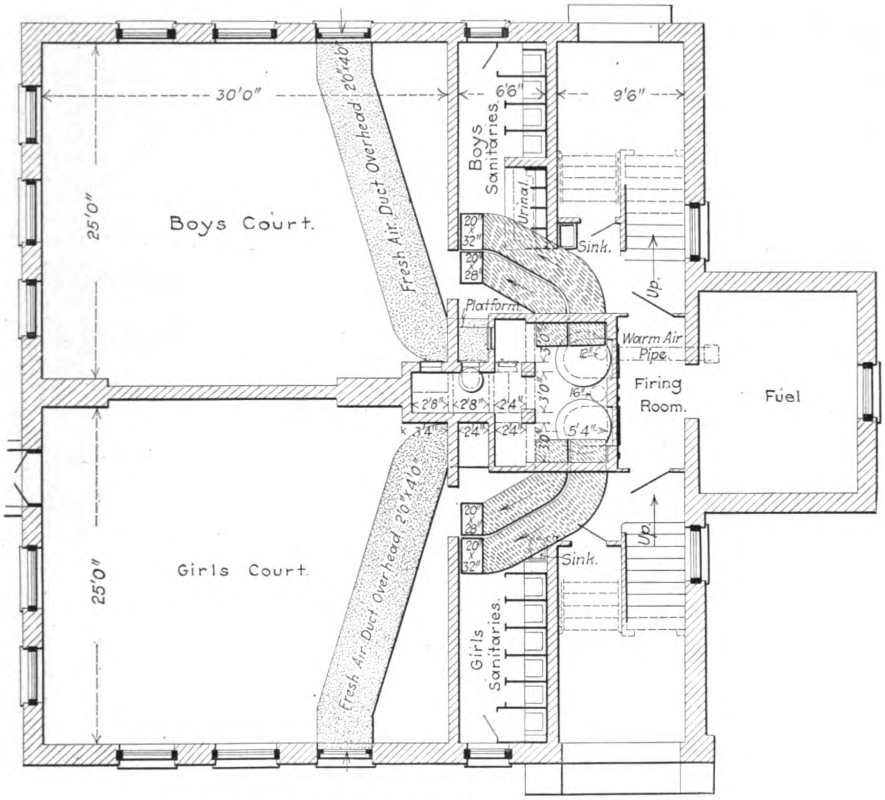


Fig. 1.—Basement Plan, Showing Location of Furnaces, Pipes, &c.

Warming and Ventilating a School Building.

140 degrees or thereabouts, which will be sufficient to overcome the additional transmission losses.

In this connection it will be interesting to observe that the engineer in designing the work arranged the warm air flues and vent flues so that the warm air was directed across the greatest amount of exposed surface, in order that air at the highest temperature might come in contact with the coldest surface. He states that calculations had been made allowing a velocity of 400 feet per minute through the flues.

The similarity of school buildings with respect to the exposed wall surface, glass surface and cubical contents is such that a comparison of the different relations of the system based on the number of occupants will be found useful when planning other work of a similar nature. From computations made in previous paragraphs it will be found that the total number of heat units necessary to supply the building is in round numbers 450,000. Two furnaces of the school type made by Fuller & Warren Company, Troy, N. Y., were used. The fire pot of each furnace is 35 inches in diameter, having a grate area of 6.68 square feet. As two of these furnaces are used the combined area is 13.36 square feet. Dividing this into the total number of heat units needed to keep the building at a comfortable temperature and supply the air for ventilation, it is found with an effective combustion and good efficiency of furnace that 4.2 pounds of coal will have to be burned to each square foot of grate surface to maintain the building at a comfortable temperature when the air outside is 10 degrees above zero. It must be borne in mind that these furnaces are fired at this rate for only about six hours in the day under close supervision of a janitor.

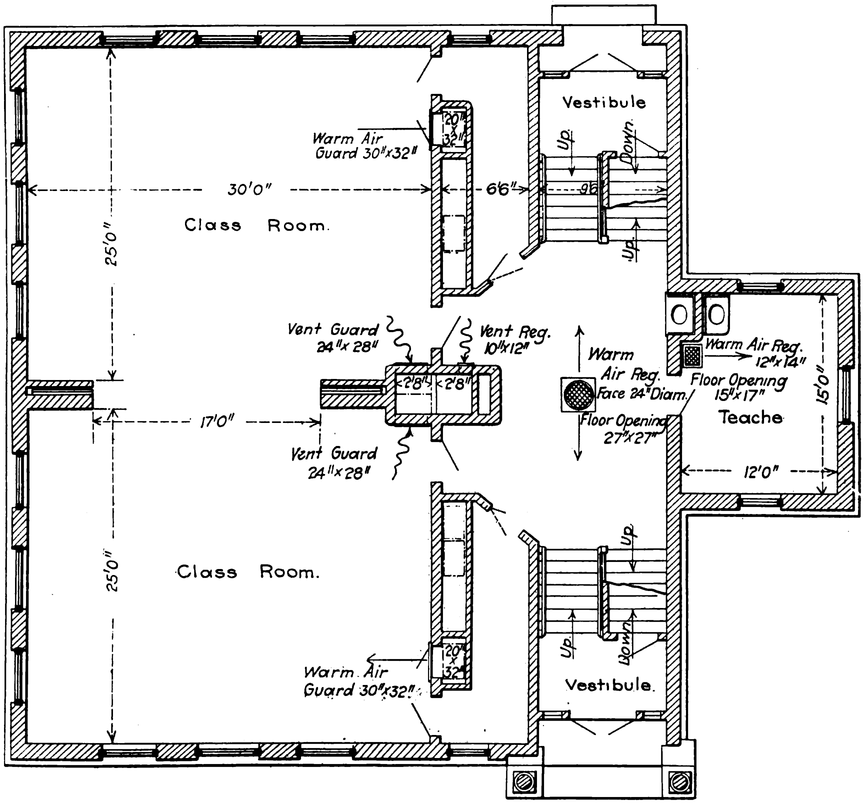


Fig. 2.—First-Floor Plan.

Warming and Ventilating a School Building.

The flues leading to the first floor provide 12.8 square inches of hot air pipe area to each pupil, those leading to the second floor provide 11.2 square inches of hot air pipe area to each pupil. In calculating the area of the fresh air ducts on this basis the results are liable to be misleading, owing to the two halls and teachers' room to be heated. These, however, will be found in practically all school buildings and so the comparison will be of some advantage. Here 11.5 square inches of fresh air duct area is provided to each pupil. A more exact method of proportioning the fresh air duct area is upon the total air supply of the building and the velocity of air in these flues. It is known that each class room requires 90,000 cubic feet of air per hour, and calculating the velocity in the flues leading to the teachers' room and the hall on the first floor at 350 feet per minute (this velocity would be slightly lower, owing to the less hight of the flue), the outlets being in the floor instead of the side wall being used as foot warmers, the teachers' rooms and halls will require respectively 16,000 and 29,000 cubic feet per hour.

In this building as well as in practically all other school buildings designed on this plan provision is made for rotating the air supply during the hours when the building is unoccupied. In this case it is done through the agency of swinging dampers in the vent flues, which permit the air being taken down through the vent flues when the building is unoccupied and returned to the base of the furnace by suitable dampers in the basement. The arrangement of these flues as well as the dampers is shown in the basement plan. In order that a sufficient velocity may be induced during the warmer days an auxiliary heater was placed in the vent flue, which is used when the temperature of the outside air is above 55 degrees. When the temperature outside is colder it is unnecessary to use this auxiliary heater, as the difference in temperatures of the two columns of air is sufficient to induce a velocity high enough to carry away all the air supplied. The heating system in this building has been in satisfactory operation for several years, a fact which attests to the proportioning of the flues and general arrangement of the heating apparatus.

Appendix.

Before concluding the article a few additional calculations may be of interest. It will be found that the total amount of air needed per hour for ventilation in the building is 405,000 cubic feet, being the 90,000 cubic feet supplied to each of the four rooms and the 16,000 and the 29,000 cubic feet supplied per hour to the teachers' room and to the halls, respectively. As this air is introduced into the rooms at 125 degrees and is admitted to the furnace through the cold air ducts at 10 degrees it has been warmed through a range of temperature of 115 degrees, so that the cold air is much less in volume. To determine the velocity that it has in the cold air ducts leading to the furnace we can proceed as follows: For every degree that air is warmed it is increased in volume, approximately, 0.00203 times itself. For the 115 degrees this means that the warm air at 125 degrees is 0.00203 x 115 = 0.233 times its volume at 10 degrees above zero. Its volume at the low temperature is therefore to be found by dividing the 405,000 by 1.233, which gives 328,000. This is equivalent to about 5500 cubic feet per minute, and as the total cross section area of the two cold air ducts is 16, it will be found that the velocity in these cold air passages is about 344 feet per minute.

Whenever any one has an extraordinary hight of flue or unusual conditions for which he must determine the velocities that air will take in the heating flues it is advisable to resort to the formula for the velocity of air dependent on temperatures and flue hight, which is as follows:

$$V = 240 \sqrt{H\ (T - t) \div 492.}$$

Of this V stands for the velocity in feet per minute; H for the hight of the heating flue—that is, from the point in the furnace where the air has become heated to the point of its discharge into the room warmed; T represents the temperature of the heated air in the flue; t stands for the temperature of the outside air. An application may be shown of it in connection with the school installation described. If we assume that the air in the flue is 125 degrees and the temperature outside is 10 above, the difference in temperature, $T - t$, is 115. We may take for H the hight of the flue from furnace to second floor outlet, 15 feet. The product of 15 and 115 gives 1725. This divided by 492 gives a quotient of 3.5. The square root of this last figure is 1.87. This multiplied by 240 gives a velocity of a little over 450 feet per minute. This figure is to be compared with the velocity assumed by the designer of 400. The formula given is arranged so as to give results 50 per cent. less than theoretical results, so that it would appear that the designer has assumed that the actual velocity would be considerably less than 50 per cent. of the theoretical, thereby allowing for losses due to friction in the air passages caused by bends, surfaces of passages and so on.

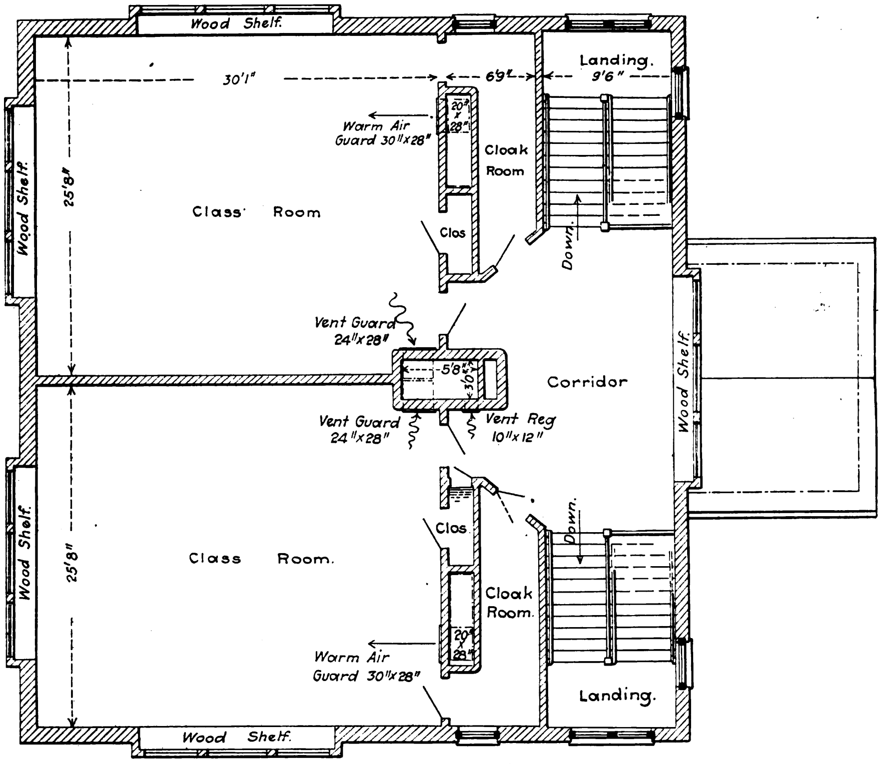


Fig. 3.—Second-Floor Plan.

Warming and Ventilating a School Building.

◆◆◆

Boston's New Skyscraper.

The new building which is to be erected on Water street for the Shawmut National Bank will give Boston another tall office building which will be a credit to the architecture of the city. The plans for the structure, just completed by Architects Winslow & Bigelow, show a building having a frontage on Water street of 191 feet, on Congress street of 88 feet and on Devonshire street of 57 feet. In style the architecture will approach the Grecian in effect, and the material used in the construction will be Indiana limestone. The bank will occupy the entire first floor, with a main entrance from Water street. The upper floors will be used for offices, there being a total of about 180 rooms. The entrance doors will be of bronze. There will be five elevators and the other equipment will be thoroughly in keeping with a modern office building. The old buildings occupying the site are now in process of demolition and it is expected that active operations on the foundations will be commenced in the near future.

WHAT BUILDERS ARE DOING.

ADVICES from various sections covering building operations for the year just closed indicate a degree of activity which is probably without a parallel in the history of the country. The value of the building improvements which have been carried to completion, or are now in progress, reach a total running into the hundreds of millions, and show a remarkable increase when compared with the figures of the year before. The very open winter thus far has been conducive to outdoor work much later than usual, and operations now under way and in prospect give promise of an active spring season.

Baltimore, Md.

It is expected that the season for general building operations will open early this year, as the prospects are unusually bright for a large business and plans for more than a score of new business structures are on the boards in various architects' offices, while fully as many more new buildings have been projected for which architects have not yet been selected. The list includes banks, factories, office buildings, warehouses, churches, apartment houses, as well as improvements in connection with dwellings, business buildings and smaller structures.

It is intimated that many unimproved lots in the burnt district will be improved this year, and the feeling exists that the volume of operations will surpass even the high record of 1905.

We have received, with the compliments of the Builders' Exchange, a copy of the Year Book for 1905 containing much valuable information relative to the organization in question. Among other things it gives the object of the Builders' Exchange, extracts from the By-Laws, a list of officers, directors and standing committees, an alphabetical list of the members, as well as a business directory of them, a list, alphabetically arranged, of the architects of Baltimore, a list of the city officials, business and trade organizations, banks, bonding companies, &c. In the summary of the year's record the statement is made that 27 board meetings were held; that the membership increased 32 per cent.; that the exchange joined in the movement to encourage manufacturing industries to locate in Baltimore; that it favored the appointment of a non-partisan sewage commission; approved the action of the City Council authorizing competitive plans for the Eastern Female High School and recommended that competitive designs be invited from local architects for all municipal buildings; approved of the movement for a union station for all steam railroads entering Baltimore; exhibited plans and specifications for many prominent buildings designed by leading local architects and others; gave support to the exhibition held under the auspices of the Baltimore Architectural Club and Municipal Art Society, and held numerous meetings in the interests of special topics touching addresses that were delivered by city officials and others, including Edward A. Roberts, secretary of the Cleveland Builders' Exchange. Fully one-half of the little book is given up to blank pages for purposes of memoranda, and on the second page of the cover is a calendar for 1906 and the first half of 1907.

The permanent exhibit in connection with the Exchange is making rapid progress, and by the time this issue reaches the readers many of the displays of building materials will probably be in place.

Buffalo, N. Y.

During the year just brought to a close the office of the Deputy Building Commissioner issued 2886 permits for the erection of new buildings and repairs and alterations to existing structures, at an aggregate estimated cost of $7,401,006. This, according to Henry Rumrill, Jr., Deputy Building Commissioner, is the largest number of permits ever issued in a single year since the organization of the bureau. The new buildings were for the most part dwelling houses. In 1904 there were 2677 permits issued for building improvements, estimated to cost $6,638,319, while in the corresponding period of 1903 there were 2011 permits issued, calling for an estimated outlay of $6,263,402. The labor situation is normal and present indications seem to point to a continuance of the amicable relations now existing between employer and employed.

Chicago, Ill.

The last year has been the most active in the history of the city—save one—1892, the year preceding the World's Fair. During 1905 permits were issued for the construction of 3337 buildings, extending over a frontage of 243,485 feet, and involving a total cost of $63,455,020, as compared with 2132 buildings, 203,785 feet frontage and $44,596,090 for 1904, an increase of 1205 buildings, 39,700 feet of frontage and $18,858,930.

Construction was not confined to any particular class of buildings, much work having been carried on in the central business district as well as along all lines of transportation in the outlying sections of the city, particularly along the elevated railroads. The construction of apartment houses was unusually heavy and bids fair to continue at an increased rate this year, and there has also been a notable increase in the construction of single dwellings. Factory and warehouse buildings were also erected on an increased scale, notwithstanding the unenviable reputation which this city enjoys for labor troubles.

During the past year the trade was unusually free from strife, and while contracts generally for the ensuing year will not be considered for at least a month, and do not expire until April 1, the indications are that the contractors will experience little trouble in reaching amicable agreements with the men.

The largest structures erected during the year in the central business district include the Commercial National Deposit Company, 18 stories, $2,600,000; estate of Charles Netcher, 7-story building, $1,400,000; American Trust & Savings Bank, 18-story office building, $1,000,000; Northern Trust Company, $750,000; Borland Building, 17-story, $630,000; Illinois Athletic Club, 12-story building, $600,000; Marshall Field, 12-story, $500,000; Mandel Bros., addition, $500,000.

Among the factories and warehouses erected the largest group undertaken is that of Sears, Roebuck & Co., which includes an office building, 9-story warehouse, power plant and printing house, at a total cost of $4,740,000. The other factory buildings include additions to the plant of the Illinois Steel Company, Chicago Dock & Canal Company, Armour & Co., new plant for Winslow Bros. Company, power house for the South Side Elevated Railroad Company, a new plant for the Commonwealth Electric Company. The cost of new schools erected during the year reached a total of $800,000.

Among the large buildings to be erected this year are the Commercial National Bank Building, at a cost of approximately $3,000,000; Auditorium Hotel addition, $1,000,000, and additions to the Fisher Building, Pike Building and Marshall Field's department store.

The permits by months, compared with 1904, are as follows:

	1905.			1904.		
	No. blds.	Feet frontage.	Cost.	No. blds.	Feet frontage.	Cost.
January...	345	9,498	$1,847,700	279	6,938	$2,150,870
February...	269	7,835	3,472,700	213	5,362	1,270,810
March.....	665	26,943	6,116,655	600	17,638	2,037,830
April.....	866	26,285	7,298,300	704	18,914	4,287,250
May.......	775	21,139	3,813,710	687	18,212	3,663,050
June......	731	21,386	7,659,360	809	21,419	5,439,705
July.......	768	18,869	3,778,390	623	16,298	3,765,000
August....	913	22,610	6,401,150	717	20,190	3,548,280
September.	1,003	27,525	7,349,150	829	25,043	5,597,450
October...	724	22,940	4,918,155	707	21,395	4,703,550
November..	830	23,187	5,099,600	631	19,990	5,785,150
December..	448	15,266	5,700,150	333	12,245	2,347,650
Totals..	8,337	243,485	$63,455,020	7,132	203,785	$44,596,090

Cincinnati, Ohio.

Architects and contractors throughout the city are quite enthusiastic over the outlook for building during 1906, and basing calculations upon the enterprises now under way and in contemplation, some go so far as to place the value of the building improvements that will be made the ensuing year as greatly in excess of previous records. The figures of the Building Department show that there were 4850 permits issued in 1905, covering improvements valued at $9,709,450, as against 4508 permits issued in 1904, calling for an expenditure of $6,335,330.

Cleveland, Ohio.

The new Board of Directors elected at the recent annual meeting of the Builders' Exchange consists of H. C. Bradley of Barkwill & Bradley, brick manufacturers; J. Harold Caunter of George Caunter & Son, carpenter contractors; Eb. Ellen ot Ellen & Norris, master plumbers; F. G. Hogen of the F. G. Hogen Company, slate roofers; W. B. McAllister of the W. B. McAllister Company, carpenter contractors; George B. McMillan, general contractor; Stephen Mills, painting contractor; J. C. Norton of Norton Bros., roofing; H. G. Slatmyer, mason and general contractor, and Henry F. Walker, mason contractor.

At the banquet following the meeting a novel feature of the occasion was the unveiling of portraits of the seven former presidents of the Exchange, with appropriate speeches by members. The likenesses were revealed one at a time, but all were mounted in one huge frame, which was called the "Builders' Hall of Fame." The portraits were unveiled with speeches by members as follows: First president, E. H. Towson, by H. C. Bradley; second, John Grant, by Stephen Mills; third, W. H. Gick, by John Leese; fourth, George Caunter, by George B. McMillan; fifth, Arthur Bradley, by Max Myers; sixth, C. W. McCormack, by F. G. Hogen; seventh, William H. Hunt, by H. G. Slatmyer.

The amount of building during the year was valued at

$9,702,660, as compared with $6,531,240 in the 12 months of 1904.

Grand Rapids, Mich.

Building operations during the last three months of 1905 showed a splendid increase over the same months of the previous year, both in the number of permits taken out and in the quality of the building, particularly the latter. The weather has been especially favorable to the contractors, and buildings which were started late in the fall have not been interrupted in their progress of construction by extreme cold or heavy snows, which are usually prevalent at this time in this locality. This city has been noticeably free from labor troubles among the building trades. The records of the building inspector show that during the last three months of 1905 there were 319 permits issued, representing an outlay of $571,470, as against 301, representing an investment of $457,175, in the same months of the year before.

Although there were the same number of permits issued during December, 1905, as there were in the same month of the previous year, the amount of the represented investment was increased $43,901. Nearly every part of the city has contributed its share to the house building wave which has swept over the city during the past year. This was more noticeable perhaps in the southeastern section than in any other. Business structures have also been going up in different parts of the city. Some of the more prominent ones now in the course of construction are the *Evening Press* Building, cement, stone and iron construction, cost $100,000; Manufacturers' Building, 7 stories, cost $86,000; business block built by John Murray, 5 stories, cost $43,000, and Grand Rapids Brewing Company, brick and cement storage building, cost $43,000.

Harrisburg, Pa.

The year just closed has been one of unprecedented activity in the building line, the improvements projected having a valuation almost double that of the two preceding years combined.

The outlook for the spring is regarded as most encouraging, as plans have already been prepared for the erection of a number of blocks, and it is expected that more will be announced within the next few weeks. One builder intends putting up 24 houses containing all the modern improvements, and other builders will start operations in the spring as soon as weather will permit. It is thought that unless something unforeseen occurs nearly twice as many houses will be erected in 1906 as in the year just closed.

Kansas City, Mo.

The past year has been a very busy one in the building line, and the amount of work projected showed a large increase over the 12 months of the year before. The improvements consisted for the most part of dwellings and business structures, a large number of the former having been erected. The high cost of labor and building materials did not seem to have checked operations to any appreciable extent, and so far as known few if any undertakings are being held up on the idea that it will pay to wait a while before putting them through. The impression seems to prevail that prices are not likely to show much if any decline, and those who want to build have apparently reached the conclusion that they had better do it now than to delay further. According to Superintendent of Buildings S. E. Edwards, there were 4437 permits issued last year for buildings having a frontage of 81,206 feet and estimated to cost $10,917,024. These figures compare with 4351 permits covering buildings having a frontage of 64,803 feet and involving an outlay of $8,816,757 for the 12 months of 1904. All things considered the prospects are most encouraging for a prosperous year in the building line.

At the annual dinner of the Master Builders' Association, held Tuesday, December 26, at the Missouri Athletic Club, the new officers and trustees were installed in office. The dinner was attended by nearly 150 members of the association, and the affair was most enjoyable in every way. The officers for 1906 are Hiram Lloyd, president; C. D. Morley, first vice-president; W. R. Wilson, second vice-president; E. P. Maule, Jr., secretary; Joseph H. Furber, assistant secretary, and John Low, treasurer.

The trustees for the ensuing year are Daniel Evans, H. C. Gillick, George Ittner, R. W. Morrison, A. H. Haeseler and S. L. Jones.

Lincoln, Neb.

The city has made a very creditable record in the building line during the past year, and the work in prospect gives promise of continued activity in all branches of this important industry. A noticeable feature of the operations has been the number of dwellings, of which there was an increase of fully 50 per cent., as compared with any previous year. The estimated value of the dwellings for which permits were issued was $1,006,106, and for public and business buildings there was an estimated outlay of $563,100. The contractors' estimates of alterations and repairs for which no permits were issued totaled $212,000, giving an aggregate for the year of $1,781,206. These figures show an increase over 1904 of $482,805, and compare with $1,015,020 for 1903. From this it will be seen that the city has made steady progress during the past few years, and it is probable that the real value of the building operations is much greater than that indicated, owing to the tendency to take out permits at the lowest possible valuation.

Los Angeles, Cal.

The total number of building permits issued in Los Angeles during 1905 was 9543, authorizing improvements aggregating in value $15,382,057. This is an increase of 2453 permits and $1,972,995 in valuation over the year 1904. A detailed statement of improvements for 1905 shows that six reinforced concrete structures were erected, one steel structure, one eight-story brick and two seven-story brick buildings. The list of business blocks and factories in brick construction include one six-story, seven five-story, four four-story, 38 three-story, 123 two-story and 122 one-story buildings, aside from 200 alterations of brick structures in frame construction for homes. The returns show that 9390 structures were erected. Of these there was one three-story frame building, 969 two-story buildings, 456 one and one-half story buildings, and 4884 one-story frame buildings. There were also 105 flats, 61 apartment houses and 1714 alterations of frame buildings. Other improvements for the year include the erection of 61 churches and 896 sheds and smaller structures.

Rapid progress is being made in the construction of the Temple Auditorium and other large business blocks throughout the city. Builders anticipate an active year during 1906, and are making plans accordingly. Building materials are plentiful, and the labor supply is about normal.

Louisville, Ky.

There is a large amount of work now under construction, and the prospects for 1906 are for a continuance of the steady growth which was manifest during the year just closed. There has been an absence of serious labor troubles, and the situation is such that matters are likely to run smooth in the future. There are at present under construction six buildings involving an estimated outlay of $2,000,000, an amount which is within $95,000 of the entire outlay for buildings in the city during the year 1899. As soon as the spring opens five important buildings will be commenced, one of 15 stories, one of 10 stories, and three of at least six stories in hight, which in point of finish and equipment will equal any that have heretofore been constructed.

According to Robert J. Tilford, inspector of buildings, there were 2255 permits issued last year for building improvements, estimated to cost $4,506,382, while in the year before there were 1919 permits issued, covering operations costing $2,313,596. The improvements at present under way and contemplated have for the most part been designed by local architects.

Milwaukee, Wis.

The activity which has prevailed in the building line during the past 12 months bids fair to continue and architects and builders are looking forward to another prosperous year. The amount of work projected in 1905 showed a large percentage of increase over the previous 12 months, thus putting the city in line with others reporting unusual activity in this branch of industry. According to Chief Inspector of Buildings Edward V. Koch, there were 4166 permits issued during the year just closed, covering building improvements estimated to cost $9,806,729, while in the year before there were 3,546 permits issued for building improvements calling for an estimated outlay of $8,131,765.

At the annual meeting of the Builders' and Traders' Exchange, held January 9, officers were elected for the ensuing year as follows: President, Joseph A. Meyers; first vice-president, A. P. Michie; second vice-president, Gustav J. Roeder; treasurer, P. E. Possom; secretary, William Hackendahl; directors, Ernst Winter, A. H. Wegner, Henry Weden and L. Hoffman.

At the annual meeting of the Milwaukee Builders' Club January 9 officers were elected as follows: President, Louis Griewisch; first vice-president, Henry Schmidt; second vice-president, George D. Sheriffs; treasurer, Henry Ferge, and secretary, A. J. Maag.

Minneapolis, Minn.

The number of building operations for which permits were issued in 1905 from the office of the Inspector of Buildings was the greatest in the history of the city and included an unusual number of buildings of heavy construction as well as dwellings and flats. Architects and builders are looking forward to a prosperous season and already a large number of heavy building propositions are in sight. According to Building Inspector James G. Houghton, there were last year 4825 permits issued for building improvements, calling for an outlay of $8,905,205. Included in these totals were 1961 dwellings, costing $3,897,365, also 124 store buildings, costing $709,555; mills and factories costing $219,000, apartment houses and flats costing $700,600, warehouses, of which 40 were built, costing $366,850, and miscellaneous buildings calling for an outlay of $1,548,-

760. Additions and repairs used up $1,395,045. Permits were also issued by the department for house moving operations, plumbing, electrical work, heating and power plants, &c., bringing the grand total for the year up to $10,364,240. In 1904 there were 4466 permits issued, calling for an outlay of $6,701,965, or, including plumbing, electrical work, house moving, heating and power plants, &c., there was a grand total of $7,820,040. From these figures it will be seen that 1905 indicated a heavy gain over the year before, and the volume of operations broke all previous records.

Newark, N. J.

The past year has not only been a most active one in the building line, but, according to Superintendent John Austin, "the last 12 months have surpassed any previous year in the history of the Department of Buildings." The building boom has caused a general demand for residential and factory property, with a steady and healthy growth, and the close of the year saw 400 permits for various buildings still under construction. During 1905 there were 2379 permits issued by the Department, calling for an outlay of $10,214,615, as against $6,412,885 in the 12 months of 1904.

The permits issued during the year just closed covered 1863 frame structures, 584 brick buildings, 10 structures of concrete, four steel and iron structures and 11 stone buildings. Superintendent Austin in his annual report expressed the belief that the present year will be a record breaker in the building industry, and that he looks forward to the adoption of a new building code by the Common Council. He considers the present one a handicap on the administration of the Department, as it does not cover many of the modern methods of building construction, such as reinforced steel concrete, artificial stone, concrete, brick veneered buildings, &c.

New York City.

The principal matter of interest just at present is the amount of building which was done in and about the city during the year just closed, and in what light the immediate future is regarded by architects and builders generally. A review of the figures which are available shows that in the Boroughs of Manhattan and the Bronx building operations were conducted on a very large scale, and that labor was fully employed. The weather which has prevailed has permitted work to be continued much later than usual, and there is a feeling that the coming spring is likely to witness a degree of activity which will be fairly comparable to that which has prevailed during the busiest periods of 1905. On our editorial page we consider the figures of the year just closed somewhat in detail.

The General Arbitration Board officially reports that the following unions signed agreements taking effect January 1: Seventeen bricklayers' unions, 18 electrical workers' unions, Elevator Constructors and Millwrights' Union, Stonesetters' Union, Tile Layers' Union, Modelers' Union, Mosaic Workers' Union, marble workers, cutters, polishers, helpers, &c.; Metallic Lathers' Union, Amalgamated Sheet Metal Workers' Union, Roofers and Water Proof Workers' Union and the Decorators' Union. The report continues:

"The wage scales of the painters, heat and cold insulators and slate and tile roofers have been submitted to arbitration.

"Agreements for the coming year are now being negotiated between the Cement Masons' Union, Hoisting Engineers', Plumbers' and Plasterers' unions."

An agreement was reached in December between the local unions of the Brotherhood of Carpenters and the Master Carpenters' Association whereby present wages of $4.50 a day will be continued until July 1 next and $4.80 a day for the remainder of the year. The cabinet makers will receive on July 1 an advance of 22 cents a day. This is the result of the demand of the carpenters for an increase in wages of 50 cents per day.

The Metal Lathers' Union, at one time a branch of the Housesmiths' and Bridgemen's Union, New York, has made a trade agreement for two years with the Employing Metallic Furring and Lathing Association of New York. The present wages of 65¼ cents an hour will be continued. When the last lockout of the housesmiths took place the Metal Lathers' Union was reorganized under the arbitration agreement with the employers.

Isaac A. Hopper on December 21 resigned as Superintendent of the Department of Building of the Borough of Manhattan.

Philadelphia, Pa.

Building operations during 1905 exceeded all previous records since the establishment of the Bureau of Building Inspection. The total estimated value of all classes of building reached a total of $34,882,235, exceeding that for 1902, which was the best year up to the present one, by over $2,372,650. During 1905 the bureau issued 8929 permits, covering 16,958 building operations, of which dwellings constituted the greater proportion, there being for those of the two-story type alone 1201 permits for 8270 operations, at an estimated cost of $16,007,175, while those for three and four story, together with frame dwellings, bring the total for dwellings up to 1675 permits for 9420 operations, at an estimated cost of $21,093,280. Permits were taken out for the erection of manufacturing plants at a cost of $1,721,150, while those for municipal buildings and schools aggregated a total of $1,321,300. The month of December individually was a good one, and permits numbering 449 were issued for 705 operations, at an estimated cost of $1,065,440.

Builders during the past month have been favored with most excellent weather conditions, and there has been scarcely any interruption to outside work. Building operations have therefore gone forward with rapidity, and considerable more work is nearing completion than was anticipated early in the winter. Conditions generally are satisfactory to the trade, and while it is scarcely expected that a great volume of business will develop during the remaining winter months, the outlook for the coming year is considered most favorable.

Labor conditions are, on the whole, satisfactory. The open season has brought out a continued demand for mechanics, and at times there has been somewhat of a scarcity of good workmen.

The Master Builders' Exchange, at a special meeting held December 23, 1905, nominated candidates to fill seven vacancies about to occur in the Board of Directors and one to serve out the unexpired term of the late Michael Magee. Those nominated to fill the vacancies for the full term of three years were F. M. Harris, Jr., George Watson, John S. Stevens, James S. Merritt, Edward Lupton, William Oglesby, Frank Reeves, Jacob Tyson, Alexander Kirkpatrick, Clifford S. Jacoby, J. S. Makin, W. F. Reynolds, James C. Taylor, John Hinneker, John R. Huhn, William B. Irvine, Cyrus Borgner and W. T. Bradley, and John W. Gill was nominated for the unexpired term, the election of which will take place at the annual meeting of the Exchange during the present month.

Pittsburgh, Pa.

More new structures were erected in the city during the year which has just been brought to a close than was the case in 1904, although the value of the building improvements is somewhat less than for that year. This is due to the fact that several costly skyscrapers were put up in 1904, but, taking into account the increase in the number of new buildings, and the insignificant decrease in their cost, the year 1905 was a remarkable one and indicates a steady growth of the city. According to the Bureau of Building Inspection, permits were issued for 4258 building operations of all kinds during 1905, calling for an estimated expenditure of $16,240,110. Of these totals 2603 were new structures, costing $11,831,175. There were erected during the year 683 brick buildings, 1089 frame structures, and 831 brick veneered, iron-clad and miscellaneous buildings. During the 12 months of 1904 there were 2428 new buildings erected, 604 additions and 915 alterations made, involving an expenditure of $17,909,319.

The annual meeting of the Builders' Exchange League was held the first week in January to consider the wage agreements with the local labor organizations for the new year. The builders are at a loss to know whether or not it would be advisable for them to sign for any big contracts at the present time, as only a few of the labor organizations have asked for a revision of the wage scale. Each year the employers are confronted with demands for higher wages and better working rules, but such is not the case this year.

The plasterers' union signed a working agreement for one year, expiring December 31, 1906. A pleasant surprise was given the men when the employers agreed to their request of 20 cents a day increase. The men were paid $4.30 a day, and this year they will get $4.50 for a day of eight hours.

Plans were announced Monday, January 15, by Secretary W. W. Campbell, of the Pittsburgh Builders' Exchange League, for the formal opening of the permanent hall of exhibits on the sixth floor of the Heren Building, Thursday, January 25. Fifty local exhibitors have secured space, and each of them will have personal representatives at this time. Members of builders' exchanges from all the large cities within a radius of 1,500 miles will be in attendance, and during the day there will be a special meeting of all visiting architects.

The exercises will begin promptly at 1 o'clock. The opening address will be made by Henry F. Hornbostel, of Pittsburgh, on "Modern Construction." Among other well-known men who are expected to attend and speak are W. H. Hanby, of Bradford, Pa., treasurer of the State Builders' Exchange League; Albert D. Kline, of Baltimore, president of the Baltimore Builders' Exchange; J. H. Scates, secretary of the Baltimore Exchange; E. A. Roberts, of Cleveland, secretary of the Cleveland Builders' Exchange, and ex-President W. H. Hunt, of Cleveland. The exercises will be open to the public.

San Francisco, Cal.

The building outlook for the new year in San Francisco and the principal cities of California is extremely favorable. Supplies of building materials are not over-abundant, with the exception of common brick, which can be supplied in large quantities at short notice. By the opening of spring it is expected that better supplies of lumber, steel and cement will be available. Prices are still rather high. The difficulty of obtaining structural steel promptly is a great drawback in building operations here. About five months is often required to get orders filled for moderate sized steel frame buildings. The new 12-story annex to the St. Francis Hotel has been greatly delayed by the non-arrival of steel.

John Galen Howard has asked for bids for the construction of the Christian Science Church at the corner of Scott and Sacramento streets, the estimated cost being about $275,000. The structure is Italian Gothic in design, and will cover an area of 96 x 126 feet. One of the two spires will be 170 feet in hight. Utah gray sandstone will probably be used in the superstructure, with concrete foundations. Sunday school rooms and a steam heating plant will occupy the basement.

Work will be commenced early this spring on the six-story steel and brick store building of I. Magnin & Co., at the corner of Post and Grant avenue. F. P. Fischer will construct the building for $60,000, according to the plans shown by Architect Hermann Barth. There will be a steam heating plant in the basement. There will be two electric passenger elevators, two freight elevators, and a dumbwaiter, built by the Bryan Elevator Company. A package conveyer that will be the first of the kind on the Coast will be put in. It will consist of a spiral chute, down which packages are to be sent to the delivery room in the basement. The work on the new six-story German Hospital building is being carried out by the owners under the supervision of Architect Hermann Barth at the expense of the Wilson-Lyon Construction Company, the original contractors.

Seattle, Wash.

The total number of building permits issued in Seattle during 1905 was 7671, with a total valuation of $6,703,999. During 1904 the total was 7438 permits, with a total valuation of $7,808,120, and in 1903 the total was 6914 permits of $6,495,781.

The outlook for the first few months of 1906 is good. Builders anticipate an active building season, with an unusually large construction of residences and a smaller class of business buildings. More attention is also being given to apartment houses and flats, and builders expect that the records for 1906 will show a considerable increase in this class of buildings.

St. Louis, Mo.

The year closes with the outlook for 1906 exceedingly bright, so far as building operations are concerned. Indications point to a large amount of work in the way of mercantile, manufacturing, factory and office buildings, the number of plans submitted to the Department of Buildings being in excess of any year in the history of the bureau. During the past year the bulk of the operations consisted for the most part of flats and dwellings, except in the closing months, when the tendency was more toward business structures. The year was practically free from labor troubles, and instead of the Louisiana Purchase Exposition creating an after period of depression quite the contrary appears to have been the case, for the value of the building improvements in 1905 is greatly in excess of the value of those projected in the 12 months of the year before.

According to Commissioner of Public Buildings James A. Smith, there were 499 permits issued for building improvements in December, 1905, valued at $1,212,029, while in December, 1904, there were 295 permits issued, calling for an estimated outlay of $651,586. Taking the 12 months of the year just closed, it is found that the number of permits issued by the department was 8285, calling for an estimated expenditure of $23,434,734, while in the 12 months of 1904 there were 5960 permits issued for building improvements, valued at $14,075,794. From this it will be seen that St. Louis has been making rapid strides in the way of building operations and that mechanics in all branches are likely to be well employed for some time to come.

Youngstown, Ohio.

The annual meeting of the Youngstown Builders' Exchange was held on Tuesday, January 2, in the rooms of the association at 209 West Federal street, when directors were chosen for the ensuing year. The meeting was well attended and reports of President W. D. O'Conner and Secretary William Campbell were presented. The report of the secretary showed that a number of new members had been added to the rolls during the past year; that the Exchange is in a flourishing condition, and that great interest has been manifest in the business of the organization.

The results of the election show the following directors to have been chosen: T. L. Davis, C. F. Kist, August Fiehler, William Campbell, J. L. Dalzell, Albert Pauley, Frank Dailey, Louis Heller, J. P. Anderson, W. H. Black, James D. Gibson and George Body.

The directors held a meeting on Tuesday, January 9, and elected officers as follows: President, William Campbell; vice-president, J. P. Anderson; secretary, James D. Gibson; acting secretary, George H. Coller, and treasurer, J. L. Dalzell. It was decided to hold the sixth annual banquet in Odd Fellows' Hall, January 23.

Notes.

The report of the Building Inspector of Atlantic City, N. J., showed that the value of the building improvements made during 1905 was $2,013,111.

According to the figures issued from the office of the Building Inspector of Trenton, N. J., the total value of building operations in that city for the year just closed was $2,117,874, as compared with $957,646 in the year before.

The leading contractors of Pittsfield, Mass., held a meeting January 10 and organized a Master Builders' Association, with the following officers: President, Edward Hume; secretary, Charles H. Beckwith, and treasurer, D. H. Pike.

Although there is comparatively little building work being done in Galveston, Texas, just now the prospects for the coming season are much more encouraging, and instead of the very inexpensive houses which have been going up in the past there will be a better class of work in the future.

Already indications point to a veritable boom in the building line in Camden, N. J., the coming spring, preparations being under way to put up a large number of dwelling houses, more especially in the northern section of the city. There is an active demand for houses, and available property is being improved as rapidly as circumstances will permit.

After a careful consideration and a thorough investigation of the matter, the Builders' Exchange of Jacksonville, Fla., has decided to inaugurate a permanent exhibit feature in connection with the organization. The feeling among the officials and membership is that a display of building materials of all kinds promises great possibilities for the architects, contractors, manufacturers, and, in fact, all those whose interests are allied with the building trades.

There has been an unusual amount of building at Rockaway Beach, Long Island, N. Y., the past season, and the open winter has permitted outdoor operations to be continued much later in the year than usual. New houses are going up in every quarter, many of them being built of concrete blocks, while nearly all of them have foundations of this material. Mechanics of all kinds are said to be scarce and builders have had more or less trouble in securing competent help.

An unusual amount of building has been accomplished in McKeesport, Pa., during the year just brought to a close, the statement being made that 400 buildings have been erected or are at present under way, representing an outlay of $2,000,000. In addition to this the new tube plant, costing $10,000,000, is now practically completed; the Elks' Temple, costing $150,000, is well under way, and the Baltimore & Ohio Railroad Company has decided to spend $150,000 for a new station. There is also a movement looking to the erection of a city hall which will cost $750,000.

In common with other cities the past year, Reading, Pa., has broken all records in the amount of building which was done. The figures show a gain of 365 buildings over 1904, which year showed an increase of 257 over 1903. Of the new work, 727 were two-story brick dwellings and 218 were houses of the same character, but with stone fronts. The firm putting up the greatest number of houses during the year was Rehr & Fricker, who erected 56. In December permits were issued for 58 new buildings, as against 42 in December, 1904.

The total value of new structures for which permits were issued in the city of Rochester, N. Y., last year was $5,563,019, which broke all previous records. In 1904 the value of the building improvements was $4,225,927, and in 1903 the value was $1,853,571. Another interesting feature is found in the fact that the month of December was the largest month of the year, with the exception of April, which holds the record for any month in any year, coming as it did within $50,000 of the million-dollar mark. The high record was due to the fact that permits were issued for several large undertakings, two of which called for an outlay of fully half a million dollars.

Building in Greeley, Colo., writes a correspondent, has been very active the past summer and fall and, in fact, the amount of work has shown a steady increase during the last three years. The buildings put up have consisted mostly of dwellings, ranging in cost from $1500 to $4000. This in a town of 6000 inhabitants speaks well for the financial situation. Most of the heavy frame construction is in connection with store buildings, usually 50 feet wide by 200 feet deep and two stories high. Nearly all classes of lumber have risen in price from 20 to 25 per cent., but what the effect is going to be on the building situation next season is difficult to determine. In future more brick and concrete will be used in the construction of buildings than has been the case heretofore.

PERSPECTIVE DRAWING FOR THE BUILDER.—V.

By M. M. Sloan.

In the several examples of perspective drawing previously explained all of the surfaces treated were plain surfaces and most of the openings in the walls were rectangular, and no attempt has been made to show the method by which arches or the lines of circular towers are obtained. It is frequently required in perspective drawing to show curved outlines; hence a few words are necessary to give the reader an idea of the method of employing these elements in a perspective drawing. A plain cylinder is illustrated in Fig. 17, in which the line marked H H is on a level with the eye. If cut through at this point the outline of the cylinder would reveal only a straight line. The top of the cylinder, however, would if visible appear as indicated by the dotted line—that is, elliptical. The bottom would also appear elliptical, though from the fact that it is not so far below the eye as the top is above the ellipse would be more flattened. As most of the curves employed in architecture are circles either in full or in part or are composed of arcs of a circle, and as the oblique view of a circle is under most conditions an approximate ellipse, the proper rendering of the curves of a perspective drawing becomes a subject for careful consideration. Without dwelling at length on the abstract principles governing the perspective of curves, the method of representing curved surfaces and lines may best be described by referring to Fig. 18. In this figure, which represents the base of a circular column, supported on a plinth block, it will be observed that the cylindrical portion is of the same diameter as the square block upon which it rests. The plan of the subject as shown in Fig. 19 therefore becomes simply a circle inscribed in a square. The plinth block may be drawn in perspective by the method described in connection with either Fig. 10 or Fig. 13, with the result shown in Fig. 18. This having been done, the center of the circle is found by crossing the two diagonals, and through the central point lines are drawn from both vanishing points, as shown by *a c* and *b d*. By referring to the diameters of the square indicated by the same letters in Fig. 19 it will be seen that the curve representing the circle in Fig. 18 must be drawn tangent to the sides of the square at the points *a*, *b*, *c* and *d*, as shown. If it is desirable to more perfectly define the limits of the curve it will be seen by again referring to the plan Fig. 19 that an octagon can be formed around the circle, as shown. The angles of the octagon may then be projected into the perspective and the lines drawn. The octagon lines at the right and left in Fig. 18 are of the greater importance, as they define the exact limits of the ends of the ellipse. For the curve representing the top of the cylindrical part corresponding to *e f* of Fig. 19 another square can be put in perspective at the proper hight above the one just drawn. To illustrate more clearly the application of the method for showing an archway in perspective, Fig. 20 is introduced. A half elevation of the arch is shown at the left, from which the hights are projected to M M of the perspective, as shown. Corresponding points in the elevation, the perspective and on the line L L are lettered the same, so that by comparing the lines of the two views the reader will have no difficulty in following the operation from one to the other, to the final drawing of the lines of the arch tangent to the octagonal outlines, the method of perspective employed being that described in connection with Fig. 13.

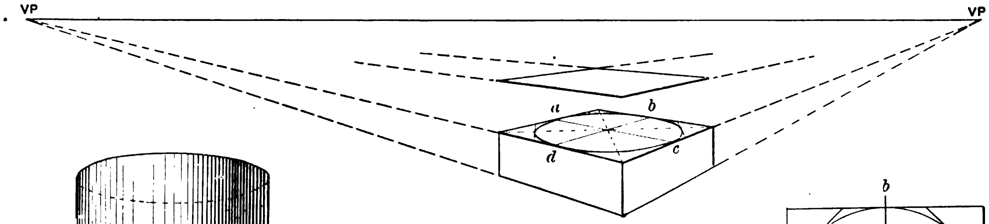


Fig. 18.—Method of Drawing a Circle in Perspective.

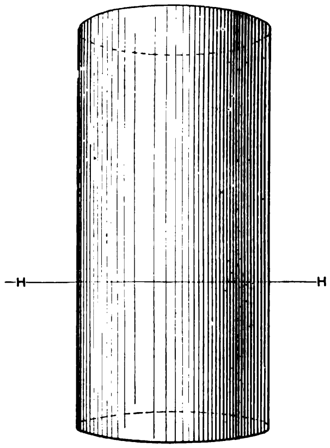


Fig. 17.—Perspective of a Cylinder.

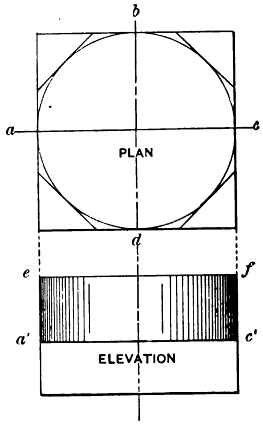


Fig. 19.—Plan and Elevation of Subject Shown in Fig. 18.

Perspective Drawing for the Builder.—V.

It is believed that a careful study of the principles and operations herein set forth will enable the reader to handle such problems in perspective drawing as may come within the scope of the builder's requirements.

◆

Pen and Ink Rendering.

One phase of the draughtsman's work which calls for a great deal of experience is the rendering of a drawing in pen and ink. Those of our readers who are interested in making progress in drawing will doubtless appreciate the following suggestions for the beginner in this fascinating art which are contained in an article by David A. Gregg, instructor in pen and ink rendering at the Massachusetts Institute of Technology, and contributed to a recent issue of the *Technical World*. At the very outset the author calls attention to the fact that to render in pen and ink a large and important drawing is no small accomplishment. Usually years of experience are necessary before one can successfully undertake such

drawings, but now and then a student is to be found having talent to the extent that the attainment of this skill seems a very easy matter, although in general this talent is comparatively rare. Ninety-five out of every hundred have a long task ahead before success is possible, but this difficulty of attainment makes the accomplishment all the more valuable.

There are three ways, says the author, in which sketches are commonly rendered, namely, with pen, pencil or brush. Pen rendering admits of stronger contrasts, hence more sparkle or brilliancy; pencil rendering is quicker, and permits of softer tones and more sketchy effects; brush rendering is by washes either in color or in India ink and produces an entirely different effect from pen or pencil work.

In pen rendering the tendency of beginners is to use too fine a pen. It must be remembered that many pen drawings are reproduced much smaller than the originals, and consequently the lines appear much finer than in the drawing itself. There are two pens that can be recommended. Years of experience prove them to be perfectly satisfactory. Occasionally a finer pen is needed, such as Gillott No. 303. The Esterbrook No. 14, a large pen, is necessary in making the blacker portions of a drawing. The Gillott No. 404 is used for general work in the same drawing.

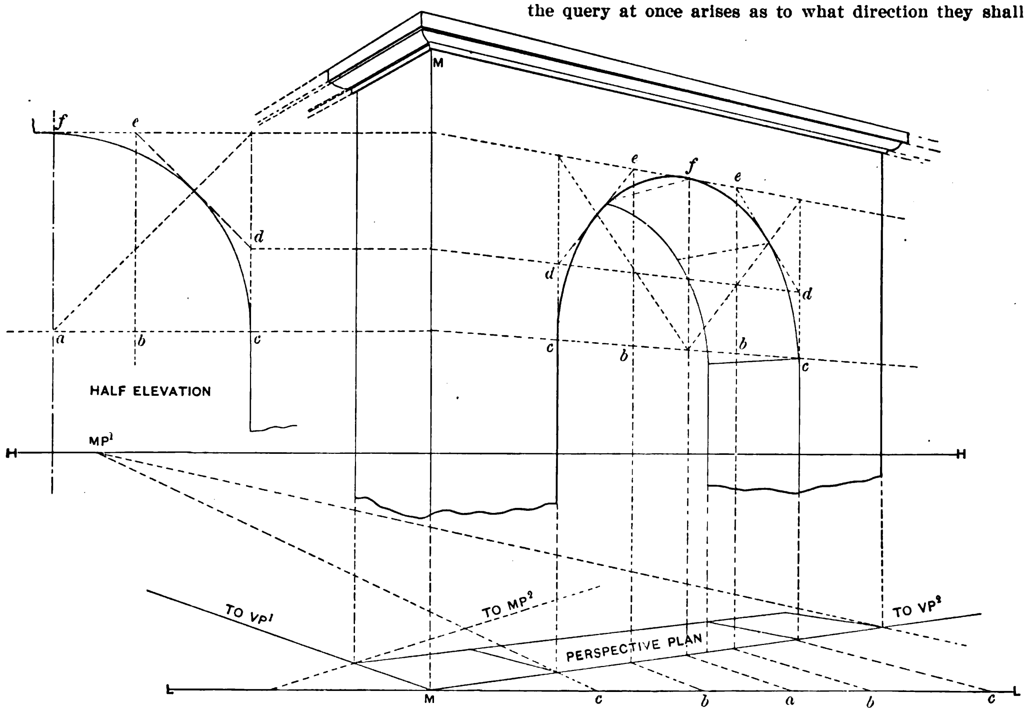


Fig. 20.—Method of Drawing an Arch in Perspective.

Perspective Drawing for the Builder.—V.

Ink is not of so much importance as pens. The various prepared India inks put up in bottles are all that can be desired. They are more convenient than ink that must be rubbed up, and they have the advantage of always being properly black. Some ordinary writing inks serve the purpose very well if reproduction is not an object; but if reproduction is desired India ink, being black, is preferred.

In the matter of paper, the very best surface is a hard Bristol board. The softer kinds of Bristol board should be avoided, as they will not stand erasure. Most of the drawing papers do very well. Whatman's hot-pressed paper is very satisfactory. An excellent drawing surface is obtained by mounting a smooth paper on cardboard, thus obtaining a level surface that will not spring up with each pressure of the pen. This is equivalent to a Bristol board. However, the size of Bristol board is limited and frequently drawings must be much larger, in which case the mounted paper is a necessity.

Too much stress cannot be laid on the importance of a good line, however insignificant it may seem. Care in each individual line is absolutely necessary for good work. A line that is stiff and hard, feeble, scratchy, or broken will not do. Such work will ruin a drawing that in other respects may be excellent.

Every line of a drawing—the outline of the building and each line of the rendering, even to the very shortest—must be done feelingly, gracefully, positively. Usually a slight curve is advisable, and, if long lines are used, a quaver or tremble adds much to the result. Each line of a shadow should have a slight pressure of the pen at the lower end. This produces a dark edge in the group of lines that make the shadow, giving definiteness to the shadow and contrast to the white light below it.

The combination of individual lines produces what we may term a *method*. The individual line may be good, but the combining may be unfortunate.

In making a wash drawing no thought is necessary concerning the direction of the wash; but in using lines the query at once arises as to what direction they shall take. A method is something one must grow into from a small, simple beginning.

The simplest method is obtained by the use of the vertical line. Some drawings can be made entirely by this means.

If several lines are drawn parallel and quite close together, but not touching, a gray color is the result. This is termed a half-tone value. Lines drawn so close together that the ink of one runs into that of the other, with little or no white space between, give a black value. The white of the paper untouched by the pen gives a white value.

This is a safe rule to follow: Get into every pen drawing black, gray, and white. Usually, in early attempts, there is a tendency to omit the black. Look for the place in the drawing where you can locate this black; you are not likely to get too much of it. Let the half-tone or gray be rather light, midway in strength between white and black. A heavy half-tone is a dangerous value. The black may often grade off into the gray, or there may be distinct fields or areas of each value.

Some Comments on Felt and Gravel Roofing.

A number of valuable papers on roofing were read and discussed at the recent meeting of the National Association of Master Composition Roofers in Indianapolis, Ind., one of the most interesting and instructive being that of Henry C. Smithers, the newly elected first vice-president of the association. He expressed his views on the subject broadly, giving especial attention to felt and gravel construction, pointing out what constitutes a good roof of this nature, and telling how the work should be done in order to insure the best results. In his opinion a felt, pitch and gravel, or felt, asphalt and gravel roof when properly put on by a competent roofer makes the best, safest and cheapest roof there is to-day. Three, four, five or six plies of felt properly put on, stuck between the laps the full width, or as much as is exposed to the weather, and using from 20 to 30 pounds of pitch to the square, the quantity being governed by the number of thicknesses of felt, makes a very satisfactory roof. The finish on top should consist of 90 to 100 pounds or more to the square, according to requirements, dry gravel being pushed into the pitch as it goes on hot.

"Never depend upon flashings on walls," said the author, "but secure your own edges and let them flash over it if they want to, for then if the flashing pulls away or rots out the paper is secure. On the other hand, if the flashing pulls or rots out your paper falls over and lets in the storm, rain or snow from the top of it and consequently leaks follow. A cheap roof can be made by using two thicknesses of felt and coarse sand or grit and using less pitch. The asphalt roof can be put on in the same manner as explained above, but much greater care should be used in handling the asphalt cement than is used with the pitch. I cannot see the advisability of giving a guarantee on a felt, pitch and gravel roof for more than five years and one for more than eight or ten on an asphalt roof. Five years is a long time for a roof, considering the price we get for it, while a good roof should last from 8 to 20 or 10 to 30 years.

"As regards fire proof qualities the gravel roof in any location is the safest roof made. I have seen where buildings here in our city that caught fire from the inside were entirely gutted and yet the roof remained.

"How about other roofs? A shingle roof is no protection at all. A slate roof is only safe a long distance off, but if the fire started from the inside or from an adjoining building on the outside the heat would crack the slate, or if water is thrown on the slate while hot it will crumble like egg shell and fall to the ground below and then let the fire out or in, as the case may be, and the adjoining building is quickly eaten up by the flames. The same results may be expected of tin and metal; the heat from the inside, as well as from the outside, would quickly unsolder the tin and it would roll up and let the fire through or let it in, and then you know the results. There are reasons governing all these things.

"The above explanation is given to cover cases where wooden sheeting is used. If a concrete or cement foundation is used, even then the gravel roof is safer than metal, for there is nothing to unsolder.

"Roofs should never be stuck to wood foundations, for the expansion, settling and shrinking in the sheeting will crack the roofing. One thickness of dry felt next to the sheeting is a good thing, especially where roofs are well stuck. Either wool felt or rosin sized paper may be used. Neither ought roofing felt be stuck to a concrete or cement foundation if it can be helped, for cement is porous and often the change from the heat to cold will crack the cement and also crack the roof that is stuck to it. A good roof properly put on to a cement foundation should have plenty of gravel to hold it down all right. I would recommend the laying of a roof of five or six thicknesses of felt in two sections. If five thicknesses, first lay one ply and then four, or first two thicknesses and then three, and stick the layers of the second section, and perhaps the first also. If six plies are used three and three layers may be used, or two and four. If dry felt is laid underneath you can stick between all sections. If no dry felt is used be more careful in sticking between the lower and second laps, for if stuck too heavily and the sheeting is open the pitch will seep through. If not open sheeting, but tongued and grooved, then the seeping through would stick the roof to the sheeting and if at any time the roof had to be replaced it would be almost impossible to get it off.

"In sticking between the laps a little harder grade of pitch should be used, but for the top finish of the roof nothing harder than a medium or soft grade of pitch should be used, conditions governing. For recoated work always a soft pitch should be used, and where you have to use coal tar for cutting purposes a distilled tar, where the light oils are all taken out, is the best.

"Gravel roofs, as we all know, are for flat or medium grade of slope, ranging from ½ to ¾ of an inch to the foot, ½ inch preferred, conditions governing. Why put on a slate roof that must be put on a steep surface, when you can put on a gravel roof and get better results, except perhaps in looks? A gravel roof 100 x 50 feet would take 50 squares of roofing at say $4 per square and cost $200, while a slote roof would require about 75 squares and cost $8 to $10, making a total cost of from $600 to $750.

"Another very essential thing is proper ventilation underneath the roofing from the outside, either through the walls or ventilators through and on top of the roof. With no ventilation, and the space between the roof and the ceiling filled with foul air, the effect on the roof is greater than is caused by all the changes of weather combined; or if there is any opening through the lower ceiling and none through the roof or wall, then the cold of winter on the outside and the hot air on the inside will cause condensation and leaks will appear. To one inexperienced in the conditions of things it will appear that the roof is leaking when it is not. A good felt should be used always, and if we could get our architects to adopt the brand of felt this association has adopted we would have the best and get better results."

◆

An English Plan of Arbitration.

An interesting and auspicious step has been taken in England for the settlement of disputes and the prevention of strikes and lockouts in the building trades. An agreement has been reached upon a scheme of conciliation between the National Federation of Building Trades Employers on the one side and on the other the Amalgamated Society, the Associated Society, the General Union of Carpenters and Joiners, the Operative Stone Masons and the London and Manchester Order of Bricklayers—workingmen's organizations comprising about 134,000 members.

Under this agreement all England is divided into three so-called "centres"—Northern, Middle and Southeastern. These are subdivided into a great number of local districts. Whenever a dispute arises between employers and employees it must be referred to the local conciliation board. If in seven days that body fails to effect a settlement, the matter must be referred to the "centre" conciliation board. If that body in turn fails, after seven days to effect a settlement, it must be carried to the national conciliation board, which is to have consideration of it for seven days. If then there is still no settlement, the parties to the dispute will be free to do as they please, but until the three boards have successively considered the case, during a period of 21 days, there must be no stoppage of work for any reason.

◆

A LARGE BUILDING OPERATION which will involve an expenditure of something like one-half a million of dollars is the new plant at Waverly, Newark, N. J., of the Lidgerwood Mfg. Company, with offices in New York City. The power house, pattern storage building and a foundry will be commenced at once. The construction consists of reinforced concrete structural steel and brick work, with a wood and slag roof over the foundry. The contract has been awarded to the Miller-Collins Company of 1133 Broadway, this city.

Scaffold Knots and Hitches.

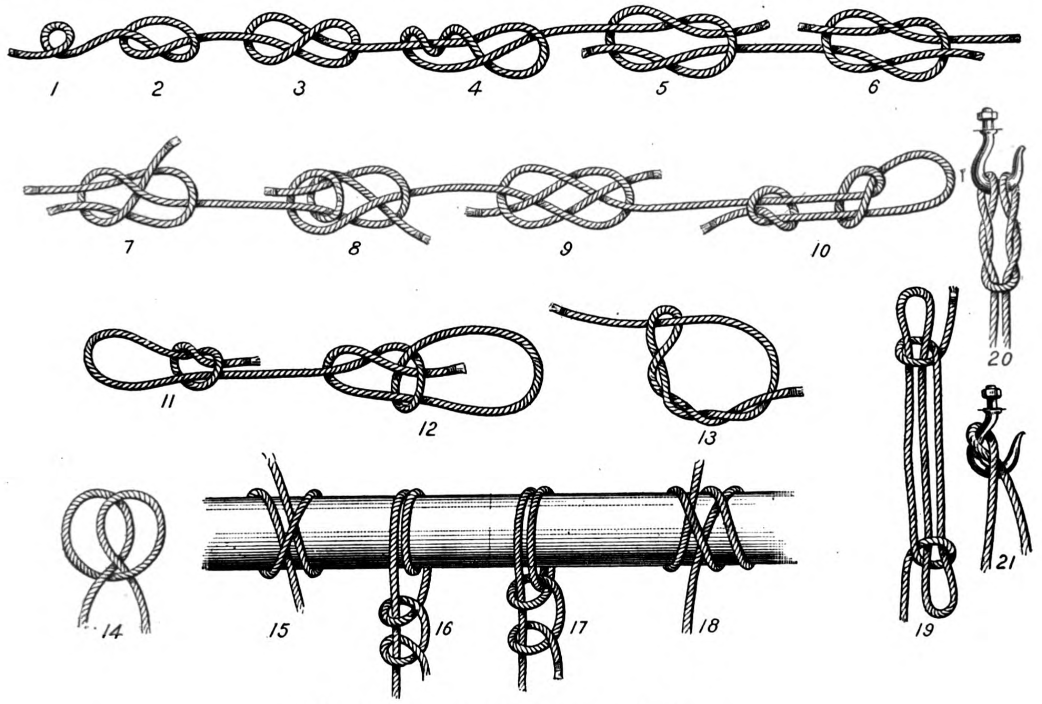
There is a great lack of knowledge among workmen generally with regard to the tying of rope for scaffolding, and when it is considered that during the erection of a building the workman lives, as it were, on the scaffold, sometimes poised in midair and in other dangerous positions where life and limb is jeopardized, it is most essential that the scaffold should be trustworthy and safe, and one of the factors of safety is the correct lashing and tying of the rope, with the manipulation of which the workman should be perfectly familiar.

As a chain is no stronger than its weakest link, so the stability of the scaffold is dependent to a great extent upon the security of its knots; hence the importance of knowing the best ones to use for the purpose required.

Although scaffolds are generally erected by qualified men, yet there are occasions when the workman requires some adjustment or addition to the scaffold for a special purpose. He has then to undertake the alteration himself and his knowledge of tying knots can be applied. The knowledge one possesses in tying knots is not confined to the one vocation of scaffolding, but is useful in all departments of everyday life. A great number of knots have been devised for various purposes. The few here illustrated are those chiefly used in the erection of pole scaffolding and comprise nearly all that are necessary. The tying of these knots should be practiced by the uninitiated, for the process is inexpensive, as the back of a chair may be utilized, a small piece or two of sash cord, with a little persistence, being all that is required to make perfect.

A very good proof that the lesson has been learned thoroughly is to tie each of these knots in the dark. The principles of a good knot are its facility in tying, its freedom from slipping and its being easily untied, says a writer in an English exchange. All knots will jam more or less when subject to a strain. In the diagrams here given the knots are shown open before being drawn taut in order to show the position of the parts. The names usually given and their uses are as follows:

1. Bight of a rope.
2. Overhand, or thumb, knot, to prevent a rope running through the sheave of a block.
3. Figure of eight knot, used as No. 2.
4. Stevedore knot; is useful when the rope passes through an eye. It is easily untied after being strained.
5. Square, or reef, knot; this is a most useful knot for joining two ropes of same size. However tight it jams it is easily "upset" and undone.
6. Granny, or thief, knot; this should not be used, as it will jam tight but not slip (as erroneously supposed), will not "upset," and consequently is difficult to undo.
7. Single sheet bend, or weavers', knot; used principally for joining two ropes of unequal sizes more securely than a reef knot.
8. Double sheet bend; more secure than No. 7.
9. Carrick bend, for fastening the four guys to a derrick.
10. Flemish loop.
11. Slip knot.
12. Bowline, for making a loop that will not slip. After being strained this knot is easily untied. Commence by making a bight in the rope, then put the end through the bight and under the standing part, pass the end again through the bight and pull taut. This knot should be tied with facility by every one who handles ropes.
13. Timber hitch; the greater the strain the tighter it will hold.
14. Clove hitch, consisting of two half hitches; used chiefly to tie ledgers to standards. This is the most useful of all the knots used in scaffolding on account of its simplicity and security.
15. Clove hitch, as No. 14, showing its application around a pole.
16. Round turn and two half hitches, for securing a rope to a ledger or for fastening the guys of derricks, shear legs, &c.
17. Fisherman's bend; used when a thick rope, such as a fall, is made fast to a ring.
18. Rolling hitch; used in a variety of ways, chiefly in making fast one rope to another that is held taut.
19. Sheepshank, for shortening a rope when the ends are inaccessible.
20. Catspaw, an endless loop, and used where great power is required.
21. Blackwaller; easily applied, but requires watching; has a tendency to slip.



Various Forms of Scaffold Knots and Hitches.

New Publications.

The Architects' Directory and Specification Index for 1905-1906; 176 pages; size 7 x 10 inches. Bound in heavy board covers with side title. Published by William T. Comstock. Price, postpaid, $2.

This is the seventh edition of the Architects' Directory, and in its compilation the same general information is furnished as heretofore. The one new feature this year is a list of building departments of the leading cities which are given, with the names of their officers. As indicated by its title, the work contains a complete list of the architects in the United States and Canada, classified by States and towns. The names of the officers and locations of the different architectural associations are given, and architects who are members of the American Institute of Architects are so indicated. The "Specification Index" of prominent dealers and manufacturers of building materials and appliances will be found especially convenient to architects, builders and owners, the arrangement of the matter being such as to render the book valuable for reference to those wishing to secure circulars or catalogues with quotation of prices on the goods named. Other matters of interest to be found within the covers of the book are the names of the various architectural societies, schools, periodicals and schedule of charges in professional practice adopted by the American Institute of Architects. In this connection it may not be without interest to mention the fact that the directory also contains a list of landscape and naval architects of the United States and Canada, indicating who are members of the American Society of Landscape Architects, also the Society of Naval Architects and Marine Engineers.

◆

Iowa Brick and Tile Association.

The twenty-sixth annual convention of the Iowa Brick and Tile Association was held in Des Moines, January 10 and 11, the attendance being unusually large. Various papers of interest were read and discussed.

Officers for the ensuing year were elected, as follows:
President, C. J. Holman of Sergeant Bluff.
Vice-President, W. H. Brecht of Des Moines.
Secretary, L. W. Denison of Mason City.
Treasurer, F. A. Stephenson of Mason City.

On the evening of Wednesday, the 10th, the members were tendered a banquet at the Grant club house. Thursday afternoon many of the visitors were taken through clay working plants of the city and in the evening there was a "smoker" at the rooms of the Elks' Club.

◆

Catalogues Wanted.

The Pittsburgh Builders' Exchange League, Heeren Building, Pittsburgh, Pa., has undertaken to establish a complete indexed library of manufacturers' catalogues, especially those which in any way pertain to articles needed in the building industry. The league would be pleased to have manufacturers send in their trade literature at once. The catalogues received will be indexed and filed without expense to the senders and will be maintained as a catalogue library for the benefit of architects and contractors.

◆

Officers of American Institute of Architects.

At the annual meeting of the American Institute of Architects, held in Washington, D. C., the second week in January, the following officers were elected: President, Frank Mills Day of Philadelphia; vice-presidents, William D. Eames of St. Louis, Charles Gilbert and William B. Mundie; secretary and treasurer, Glenn Brown of Washington, D. C.

◆

A COMPETITION in designs for a pair of doors, transom and the space above the transom, to be executed in bronze for the chapel of the Naval Academy at Annapolis, has just been announced by the National Sculpture Society, 215 West Fifty-seventh street, New York City. The competition is open to all sculptors, who are at liberty to adopt any treatment they please, determine whether the doors shall be divided into parts or not and to choose their own subjects. The masonry opening into which the doors are to fit is 21 feet 4 inches high and 10 feet wide. There are to be two doors, each not less than 4 feet 2 inches wide and 14 feet 4 inches high. The doors are the gift of Robert Mapes Thompson, as a memorial of the class of 1868. There are four prizes, the first of course being the award of the contract for the execution of the doors, which are to cost $15,000; the second being $250; the third $150, and the fourth $100. Competitors have until March 20 to turn in their designs.

THE winter term of the Association Institute, connected with the Young Men's Christian Association at Detroit, Mich., opened on January 2, with both day and evening classes. In addition to courses in mechanical and freehand drawing, plumbing, electrical wiring, &c., there have been added courses in architectural drawing, plan reading and estimating, which are calculated to meet a well defined demand for instruction of this character. The course in architectural drawing is in charge of C. L. Phelps of the firm of John Scotten & Co., while the course in plain reading and estimating is in charge of L. H. Bowley, who is connected with Albert Kahn & Co. The course in electrical wiring is designed to give the student practical experience in the wiring of houses, the connecting of two and three point switches, connecting fixtures, &c.

CONTENTS.

Editorial— PAGE.

Correspondence—

Novelties

ABSOLUTELY UNPARALLELED

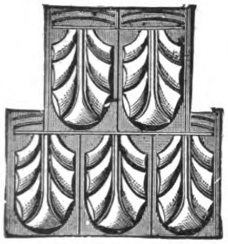
AUTOMATIC
MITRE CLAMP

Try a sample! We say it is the simplest, most unique and thoroughly efficient, low-priced clamp on the market.

Sets in place and clamps a mitre in less time than it takes to make a full turn of a single screw.

Ask for Descriptive Circular No. 1858.

HAMMACHER, SCHLEMMER & CO.,
HARDWARE, TOOLS and SUPPLIES.
NEW YORK SINCE 1848.
4th AVE. & 13th ST. (BLOCK SOUTH OF UNION SQUARE.)



NEW CENTURY

PAINTED TIN
GALVANIZED
COPPER : : : :

BECAUSE

They are More Artistic, More Durable, More Fire-proof, Making our

NEW CENTURY
METAL SHINGLE

The Most Popular of all.

MANUFACTURED SOLELY BY

The Chattanooga Roofing & Foundry Co.,
CHATTANOOGA, TENN., U. S. A.

Carpentry and Building
WITH WHICH IS INCORPORATED
The Builders' Exchange
PUBLISHED MONTHLY

To all parts United States, British America and Mexico, - - $1.00 Per Year
To all other Countries, - - - - - - - - - - 1.25 Per Year

Advertising Rates on Application.

BUSINESS OFFICES.

NEW YORK—David Williams Company, Publishers.......14-16 Park Place.
PHILADELPHIA—S. S. Reckefus, Manager..Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—Walter C. English, Manager.......Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. Walker, Manager.......Park Building, 357 Fifth Avenue.
CHICAGO—A. A. Ainsworth, Manager.......Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—Henry Smith, Manager.......Pickering Building, Fifth and Main Streets.
CLEVELAND—Ezra S. Adams, Manager.......The Cuyahoga, 311 Superior Street.
LONDON OFFICE.......Hastings House, Norfolk Street, Strand.
AUSTRALIAN OFFICES.......Melbourne, 231 Elizabeth Street.
Sydney, Palings Buildings.

ENTERED AT THE POST OFFICE, NEW YORK AS SECOND-CLASS MATTER.

HOUSE HINTS FOR THOSE WHO BUY, BUILD OR RENT A HOME.

A pamphlet of intelligent suggestion which even the professional builder will do well to consider.

Recites vital points concerning advantages defects and shortcomings in location, site, environments, appointments, construction, foundations, cellars, walks, roofs, stairs, halls, doors, plastering, painting, plumbing, lighting, heating, papering, etc.

25 cents, postpaid.

DAVID WILLIAMS COMPANY
14-16 Park Place, New York.

Digitized by Google

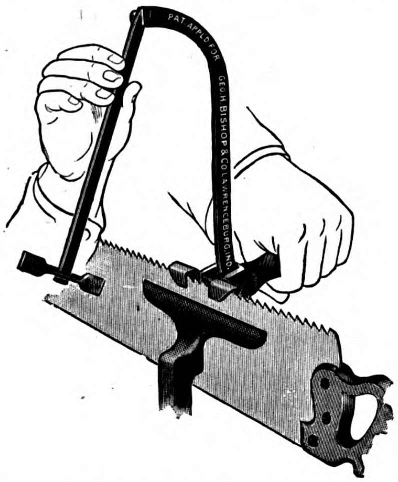
Original from
UNIVERSITY OF MICHIGAN

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

NOVELTIES.

The Bishop Hammer Blow Saw Set.

George H. Bishop & Co., Lawrenceburg, Ind., and Cincinnati, Ohio, having in view the proper care of saws, have designed and patented the hammer blow saw set illustrated in Figs. 1 and 2. It is claimed for the set that all the teeth are set absolutely uniform with just the right pitch, without breaking or chipping them and leaving the lower portion of the tooth flush with the body of saw, giving the same smoothness and free running as when new. The degree of set is regulated by the gauge controlled by the wood handle, the stake being firmly set against the tooth and the hammer resting on the tooth before the blow is given to make sure the tooth is in the right position, so that the hammer will strike it square. A full swinging blow is given by grasping the hammer arm near the joint, one or more strokes being given as desired. The hammer is made with a wide and narrow face end to suit either coarse or fine teeth. The entire tool is made of tempered tool steel, nickeled, and is durable. The set weighs 15 ounces, is 9 inches long, put up one-third of a dozen in box.



Novelties.—The Bishop Hammer Blow Saw Set.—Fig. 1.—Showing Application of the Device.

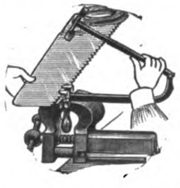


Fig. 2.—Handle of Bishop Saw Set Held in Vise.

The Geetzy Air Moistener.

An air moistener has been brought out by the Geetzy Company, 211-213 Madison street, Chicago, Ill., for maintaining indoor humidity at a proper degree. The moistener is manufactured for attachment to radiators, steam pipes, side wall registers and stoves, and consists of a galvanized iron reservoir of 2 to 6 quarts capacity, fitting close to the heating apparatus to which it is attached in order to secure the full evaporating effect of the heat on the water contained therein. It is equipped with a set of perforated braces or sockets at either inside end. Into these sockets is set a copper wire frame which makes a rack extending lengthwise of the moistener. After wetting it the evaporating sheet, made like a roller towel, is thrown over this frame and the ends of the sheet extend down into the moistener. By capillary attraction the water is sucked out of the reservoir over the surface of the evaporating sheet. When soiled the sheet may be rolled around until a clean portion is exposed. To keep the sheet in a sanitary condition the company offers in connection with the moistener what is known as Formazone. The reservoir is provided with wires by which it is attached to the radiator, stove or other type of heater. The reservoir is filled through openings on the side. Where the moistener must be attached to the front of the radiator the perforated shield attachment hides the evaporating sheet from view. The moisteners are furnished with gilt, aluminum and bronze finish.

Kid Covered Pocket Steel Tape.

The Lufkin Rule Company, Saginaw, Mich., and 280 Broadway, New York, has just added to its line of pocket steel tapes the No. 123½, which is exceedingly small and handsome in appearance. The tape, with stop, is about 5-32 inch wide and 36 inches long. The case itself is neatly covered with maroon colored kid and is only 1-16 x 5-16 inch in outer dimensions, thus affording an accurate pocket tape of very small size. The goods are daintily put up singly in double pasteboard boxes, covered with watered satin paper.

Forest City Blind Stile Bit.

In order to meet the demand of manufacturers of blinds for a bit suitable for boring the stiles, the Forest City Bit & Tool Company, Rockford, Ill., has brought out the tool illustrated in Fig. 3 of the engravings. The bit is made right and left hand, thus adapting it to varying requirements, and is intended for use in blind boring machines. It is provided with a regular twist 1 inch in length and a brad point. The regular shank is 1 inch long by ¼ inch diameter. The brad point is used instead of the screw point in order to make withdrawal easy. The company is distributing among its friends in the trade a daintily printed catalogue of 48 pages illustrating and describing the mortising and boring machine supplies which it is prepared to furnish. The wood boring bits, hollow mortising chisels, tools, &c., referred to are especially adapted for use in planing mills, furniture, sash, door and blind factories, agricultural works, car shops, colleges, technical schools, arsenals, navy yards and other institutions. The publication is known as Catalogue G and cancels all previous editions. The aim has been to illustrate in a concise and practical way the company's regular lines of tools, adding only such information as may prove of value. All the tools illustrated are manufactured in the company's shops, are thoroughly tested and sold under its guarantee.

The New Herrick Refrigerator.

A new line of refrigerators now being placed on the market by the Herrick Refrigerator Company, Waterloo, Iowa, shows several changes as compared with old styles, affecting the whole refrigerator in workmanship, material and general construction, for not only have improved ornamentation and greater durability been obtained but more economical refrigeration has been secured. In the latter respect a substantial saving has been effected in ice consumption. While some people gauge the efficiency of a refrigerator by the ice capacity, carrying the idea that the larger amount of ice it holds the more valuable it is, the manufacturers of the Herrick have demonstrated in this line the successful operation of a refrigerator with a small amount of ice, thereby not exposing an unnecessary quantity at the sacrifice of the storage capacity. This new type of the Herrick make also possesses a perfected circulation system made up of open center draft pans, air ducts and other scentific construction. It is explained that a continuous, pure, cold dry air current is forced through all compartments, removing all odors and gases arising from the articles stored and delivering them through a process of nature entirely outside of the refrigerator; keeping the walls dry, sweet and clean, and affording proper sanitation and preservation of the articles stored. Another important feature is the insulation, the basis of which is a heavy packing of mineral wool 1½ inches thick. A high-grade material is used and is so packed in the walls that there is no chance for sagging, as it is held firmly in place. This heavy insulation contributes to the economical consumption of ice and is an important factor in reducing the operative cost. The cases of the refrigerators, with the exception of the two smallest sizes, are constructed of solid oak in a fine finish. The doors overlap, making them practically airtight. The trimmings are of a special design and the fasteners and hinges nickel plated. All the refrigerators are mounted on casters. The line is provided with an improved trap, made of heavy galvanized iron, which carries off the water from the ice pan, at the same time excluding any warm air which might work through from the

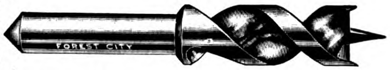


Fig. 3.—The Forest City Blind Stile Bit.

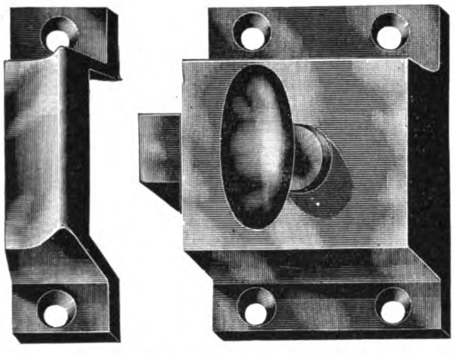
outside. In the glass lined refrigerators the drain tube is nickel plated. The trap can be quickly removed, cleaned and replaced. The pans used are constructed of heavy galvanized iron and are seamless. The new line is lined in spruce, enamel and opal glass, and is built for residences, hotels, restaurants, clubs, grocers, dining cars and for other purposes.

Cupboard Turn.

The cupboard turn, with oval knob, as shown in Fig. 4 of the cuts, has just been added to its line of builders' hardware by the Peck, Stow & Wilcox Company, Southington, Conn., and 27 Murray street, New York City. The illustration is actual size, there being three finishes on the cast iron base, as follows: Old copper, bright bronze and dull brass finish. Another style, similar in character both as to material and finishes, is a cupboard turn with round knob.

Mercier's Safety Shingling Bracket.

The latest candidate for public favor in the way of a shingling or scaffold bracket is the device which is being put upon the market by Edward Mercier, Highland Station, Springfield, Mass. The device is of simple yet durable construction, is quickly applied and is claimed to fill every requirement as a staging support on a roof, while at the same time it does not make holes to cause leaks after the shingling has been completed. The bracket weighs 1½ pounds and the manufacturer claims that its use results in a great saving in labor. Building contractors in Springfield who have used it are said to be greatly pleased with it, finding it very convenient and satisfactory in every way. A circular which the manufacturer has issued briefly sets forth the merits of the bracket and shows its application in connection with work upon a roof.



Novelties.—Fig. 4.—Cupboard Turn, Oval Knob.

Pike's Stonoil.

Pike Mfg. Company, Pike, N. H., is offering to the trade an oil which it considers ideal for use on oilstones, hones or other abrasive surfaces. It is marketed under the name of Pike's Stonoil and is said to have been perfected after many years of experimenting with various combinations of lubricants. It is described as absolutely free from acid, so that it will not corrode or harden stones, and also free from vegetable matter, which would make it become gummy and cause the stones to glaze. Although thin enough to flow freely, it has sufficient body to float off heavy steel cuttings. Stonoil is said to be adapted for cleaning all finished wood or metal surfaces and an excellent oil for guns, sewing machines, razor strops, clippers, clocks, locks and other articles requiring a lubricant or preservative. It is put up in two sizes: 6-ounce bottles with nickel screw caps and 2-ounce plain bottles.

Perkins Draw Stroke Trimmer.

A machine which is likely to prove of more than passing interest to cabinet makers, inside finishers, pattern makers, &c., is the draw stroke trimmer which is manufactured by Perkins & Co., 70 to 130 North Front street, Grand Rapids, Mich. It is made in two sizes and is of such a nature that it can be operated on a bench or on a standard, as preferred. It can be used with the greatest efficiency by the inside finisher, especially where nice work and plenty of it is involved, such as paneling, wainscoting, hardwood floors, &c. The machine, it is pointed out, is practically a substitute for the block plane, try square, bevel square and straight edge, and while one cannot saw a board in two with it, he can, after the board is cut within a close margin of the finished size, give a perfectly smooth surface exactly at right angles to the face of the board and at such an angle to the edge as the workman may determine to be necessary in order to make the joint. The point is made that to the novice in the use of tools the machine makes him an expert, while to the expert familiar with his kit the machine improves the highest grade of work which it is possible for him to perform with his usual complement of tools and quadruples his capacity.

Acme Ball Bearing Jack.

The new Acme Ball Bearing Jack, which is intended for light or extremely heavy loads and which is being introduced to the trade by the Acme Ball Bearing Company, Chappaqua, N. Y., is illustrated in Fig. 5 of the engravings. One very strong feature of the device is the ratchet brake, which it is claimed renders it impossible to drop the load when in use. The construction is such that one man with a 20-inch lever can raise a car having a capacity of 100,000 pounds. The jack has been subjected to some very severe tests in connection with heavy cars and bridge work and has given a very good account of itself. It is made in six sizes, ranging from 7 inches to 36 inches.

The South Bend Cement Brick Machine.

We have before us a circular calling attention to a new and improved brick machine, embodying features which render it simple in construction, durable and easily operated by either hand or power. It is of such a nature that the manufacturers make the broad claim that it will "revolutionize the brick industry of the country." It is built in 10, 20 and 40 brick sizes, and in addition to the ordinary brick produced in the machine they can be made in any color, or if desired the face of the brick can be veneered ¼ inch with a richer material, thus giving a brick of high grade and one which will command a corresponding price. The claim is also made that the brick turned out by this process are equal to pressed brick in appearance and quality, while the expense of facing is small. The cement brick produced are densely compressed, perfectly smooth, with no broken corners, and can be made into either plain or fancy shapes according to requirements. One operation makes 20 brick, which are taken away from the machine as quickly, it is stated, as one brick or any number less than 20 made by other machines. The general appearance of the apparatus is clearly indicated in Fig. 6 of the engravings. The machine is constructed of the very best malleable steel and on account of its strength the claim is made that it can be operated to its full capacity with no danger of breaking. The machine has quick action and gives a large output at small expense. The apparatus is being placed on the market by the South Bend Ma-

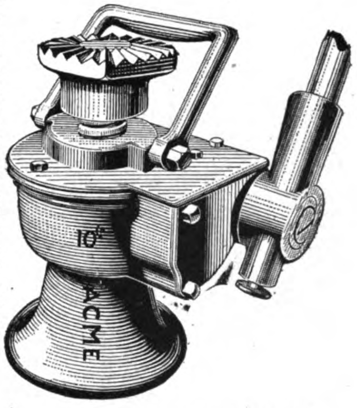


Fig. 5.—Acme Ball Bearing Jack.

Fig. 6.—South Bend Cement Brick Machine.

chine Mfg. Company, 1702 South Franklin street, South Bend, Ind.

Novelties.—Fig. 7.—Ideal Concrete Block Machine.

Ideal Concrete Block Machine.

The concrete block machine, illustrated in Fig. 7, manufactured by the Ideal Concrete Machinery Company, South Bend, Ind., is of simple design and adapted for rapid and accurate operation. In it the face plate forms the bottom of the mold and the pallet is set in place inside the front of the mold. In operation the cores are drawn out of the mold, as shown in the illustration; the pallet is inserted and sufficient concrete is put in the mold that when tamped it will come up to the core openings in front and rear. By operating the lever the cores are drawn into the mold, the concrete is then added until the mold is filled and the straight edge is used in removing the surplus material. The cores are then withdrawn by the reverse operation of the lever. The handles on either side of the front mold are then grasped and the latches raised, and the block is raised and turned over on its side. The end doors are lowered one at a time and the face plate is so adjusted that it falls away from the block. The block can then be carried away from the machine on the pallet. When a change of face or design is desired the required plate can be set into place by opening up the mold and fitting it over iron pins set at the lower edge of the front plate. This machine is adapted to the molding of both inner and outer corner blocks, circle blocks, outer and inner octagons, pier blocks, chimney blocks, cable blocks and pier cap molds. Almost any conceivable block shape used in building construction can be made on the machine, while the unusually large number of face plate designs permits of a great variety of effects being produced. Adjustments and accessories for use on or in conjunction with the machine are continually being produced, and the operator of the machine has in reality several machines in one, the parts being interchangeable for 4, 8, 10 and 12 inches. Parts for producing course blocks 4 inches high, chimney blocks, veneer blocks, copings, porch piers and octagons in any degree and circles of any radius, and the most recent production is an octagon face plate in rock panel in plain and tooled designs. With this plate can be produced any degree angle from 20 to 80. The Ideal Concrete Machinery Company, South Bend, Ind., has just placed on the market a new machine which is adjustable to an extreme length of 60 inches, width of 18 inches and a hight of 9 inches. On the machine illustrated in Fig. 7 there is a table over its rear portion, with a front edge even with the rear edge of the mold, on which the mixture from the mixing box is deposited, which can readily be drawn by the operator as desired. The pocket in this mixing box is used for depositing the facing mixture. The company is capitalized at $100,000 and its factory building is 50 x 80 feet, three stories high, and has a total of 14,000 square feet. The basement of the building is used for the storage of unfinished castings and iron pallets. The first floor is the shipping room and offices, second floor for machinery and manufacturing department and the third floor is occupied by the pattern and wood working departments. The erection of a new and more commodious plant is contemplated in the spring on account of the company's constantly growing business. This machine was invented by Frank A. Borst of Auburn, Ind., president of the company.

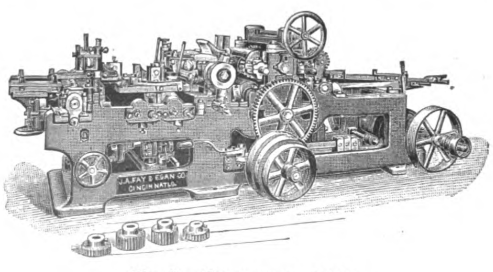


Fig. 8.—Heavy Inside Molder.

Heavy Inside Molder.

A machine well adapted for working heavy moldings, flooring, ceiling, &c., and which is made in two widths is the inside molder illustrated in Fig. 8 of the engravings. The frame is referred to as being of the new type, square, open built and ribbed inside, thus giving great strength and rigidity. The cylinders are of solid forged steel, the upper one being belted at each end and mounted in a housing, whereby both bearings are yoked together. The lower cylinder is placed at the feed-out end of the machine and is belted on the right end only, thus leaving the left side of the machine for ready access to heads and guides. The side heads are made to swing the cutters, the spindles being of large diameter. The side spindle housings have vertical and angle adjustments and also a horizontal movement entirely across the machine. The spindles have a vertical adjustment in their housings, permitting the heads to be accurately lined up while the machine is running. There are four feed rolls 7 inches in diameter driven at each end by heavy gears. The chip breaker before the upper cylinder is made in sections, each of which is independently adjustable to clear projecting knives and still maintain the pressure close to the cut of the cylinder. The bar after the upper cylinder is carried on the upper cylinder housing and raises and lowers with it. The bar before the lower cylinder is vertically and horizontally adjustable, as is also the table after the cylinder, which is carried on the lower cylinder housing and adjusted with it. This table is also arranged to swing down out of the way so as to permit of easy access to the lower head. The feed of the machine is driven by cone pulleys, giving speeds of 15, 30 and 45 feet per minute. It is regulated by means of either a clutch lever at the feed-in end of the machine or one at the left side near the matchers. The machine here shown will work up to 6 inches thick and 12 and 15 inches in width. The tight and loose pulleys are 14 x 8 inches and should make 750 revolutions per minute. It is manufactured by the J. A. Fay & Egan Company, 221 to 241 West Front street, Cincinnati, Ohio.

Catalogue of the Foster-Munger Company.

A work which will be found to serve an excellent purpose as a book of reference for the builder is the catalogue of 802 pages which is being sent out by the Foster-Munger Company, West Twentieth and Sangamon streets, Chicago, Ill. It is of a size convenient to handle, the illustrations are numerous and the descriptive matter adequate. Within its covers is shown a very complete line of doors, blinds, sash and mill work in sufficient variety to meet

all reasonable requirements. Among the early pages are directions how to find the company's offices, some comments about special sizes of doors, blinds or sash peculiar to the different local markets, together with directions for ordering goods. Sizes, dimensions and prices are given in the form of tables which are scattered profusely through the work, and the matter is arranged with a view to best meeting the requirements of the trade. The list of designs is too extensive to particularize, but mention may be made in passing of designs of gable ornaments, stairways and newels, mantels in great variety, grill work in profusion, bank and office partitions, hardwood floors and wood carpet, transom lights, church windows, embossed or carved moldings and plans for houses, in connection with which the price is stated for a complete set of specifications, details, &c.

New Britain Band Saw Filer.

A device which will be found of more than ordinary interest to all users of band saws is the new filer now manufactured by the New Britain Machine Company, New Britain, Conn. The claim is made that a right hand resaw filed on it and set by the "equal blow" method will resaw a ⅞-inch board into 12 thicknesses. This, it is pointed out, illustrates the perfection of the sharpening and set and shows the possibilities for good work now within the reach of every band saw user. The manufacturer points out that in order to preserve the individuality of hand filing and yet make it as nearly mechanical as desirable a vise is provided in which there is no clamping in the old way between every few teeth. The file feeds the saw along by pressing it from left to right; the hardened vise jaws yield against such pressure and automatically tighten again when the feed has taken place. The file is guided by antifriction rolls on a level plate which guarantees the teeth being filed always square across. Any desired amount of hook to the teeth is attained and retained by locking the file against rotation in its holder. Reference is made to the fact that interruptions do not effect the work as one may stop and then take it up exactly as left off. One of the important gains over machine work which files the front of the tooth last lies in the possibility of sharpening the top of the tooth last by filing from left to right of the saw while in the position shown in the engraving. The filer clamps to any bench not over 2 inches in thickness, holds saws up to 1 inch in width, and all thicknesses from No. 24 to No. 18, Stub's gauge. Attention is called to the fact that all saws but the heaviest may be laid in three coils on the bench back of the filer and fed through by the file as described. The heaviest saws are best handled between wheels in the time honored method now made so that not a moment is lost by shifting along as was formerly the case. The manufacturer claims that with the New Britain band saw filer any novice can become an expert filer, and that band saws can be put in condition to do good work in a very short space of time. Those of our readers who are interested in this device can obtain a copy of "Circular A" upon application to the company.

EDWIN H. BLUME has opened offices as an architect on Main street, Riverhead, Long Island, N. Y., and would be glad to receive catalogues and samples relating to architecture and building.

TRADE NOTES.

A TOOL in which every carpenter and builder in the country is likely to be interested is the square and miter shown in our advertising pages this month by P. L. Fox, 432 William street, Bridgeport, Conn. The tool has sliding and detachable blades which can be adjusted from 5 to 8 inches. The manufacturer refers to the device as constituting a whole set of squares in one tool.

H. B. IVES COMPANY, New Haven, Conn., presents in its advertising space this month a special offer to carpenters, builders and owners of homes. For the purpose of introducing the Ives patent window ventilating lock the company offers to mail to any address prepaid for $1 four of the locks in genuine bronze, brass or antique copper finish, as may be preferred. The company will also include a 40-page hardware catalogue and working model to carpenters who wish the agency to canvass for its sale. The lock is referred to as a very simple contrivance for ventilating rooms; is easily applied and exceeding strong for the purpose. It is an extra protection to the window in addition to the usual sash fastener, and being a permanent fixture commends itself to the public.

THE first issue of the new year of the Cortright *Metal Shingle Advocate*, published by the Cortright Metal Roofing Company, Philadelphia, Pa., and Chicago, Ill., contains much that is interesting both to those engaged in the roofing business and to the general reader. Reference is made among other things to the satisfactory business of 1905 and to the fact that the company spares no expense in making Cortright metal roofing as good as it is possible to make it, wrought out by thoroughly capable and trustworthy hands. Among the illustrations is a half-tone engraving showing a number of houses at Newport, R. I., which are covered with Cortright metal shingles, the builder stating that in all there are ten houses, some of which have been built since 1886. He contrasts the cost of metallic and wood shingles and refers to the satisfaction which in the long run the former have given. An interesting feature of this issue of the *Advocate* is a calendar for the first six months of the new year.

THE BRADT PUBLISHING COMPANY, 260 Michigan avenue, Jackson, Mich., points out in its advertising card in another part of this issue that "the successful builder conducts his business on systematic principles," and that he requires among other things a rapid method for estimating the cost of labor and material. Such a method has been prefected by a prominent builder, and the company has compiled the matter in book form, which it is offering at the low price of 50 cents. What is said in regard to the matter cannot fail to prove interesting to a large class of readers.

THE CHICAGO HOUSE WRECKING COMPANY, with main office and yards at Thirty-fifth and Iron streets, Chicago, Ill., has issued a catalogue of 425 pages, calling attention to some of the vast number of articles which it is prepared to supply at rates which cannot fail to command attention. Special notice is called to the dismantling of the World's Fair buildings at St. Louis and Chicago and the expositions at Buffalo and Omaha, which were built at a cost of $90,000,000. A large percentage of the material listed in the catalogue was bought by the company at sheriffs', receivers', trustees' and assignees' sale, thus affording opportunity to reoffer it at figures likely to appeal to all who may be interested. Practically everything required in building construction and equipment, machinery, pumps, tools, plumbing goods, electrical supplies, furniture, awnings, cabinets, typewriters, office desks, cots, couches, uniforms, clothing, school desks, &c., are referred to in the catalogue. Especially interesting in this connection is the announcement which the company makes in its full page advertisement in another part of this issue relative to the materials which it offers from the St. Louis World's Fair.

SMITH & HEMENWAY COMPANY, 296 Broadway, New York City, has been obliged to make an addition 30 x 70 feet in size to its tool factory in order to meet the increased demand for the Red Devil and Woodward tools. One of the latest designs is the No. 030 cutter, which has the double advantage of being a glass cutter and a point driver. The statement is made that the foreign business of the company during the past year has shown an increase of over 30 per cent. During 1906 the company will introduce the miniature valve of the Davison Mfg. Company, and will also represent the specialties of the Kingsley Mfg. Company, makers of a combination lock, latch, hasp and staple, Wallingford, Conn.; the Divine Water Motor Company, makers of the Divine water motor, Utica, N. Y.; the Champion Mfg. Company, makers of hardware specialties, Rocky Hill, Conn.; the Vandegrift Mfg. Company, makers of the Vandegrift wrench, Shelbyville, Ind., and the Schatz Hardware Mfg. Company, makers of nail pullers, miter boxes and electrical tools, Chappaqua, N. Y.

E. C. ATKINS & CO., INCORPORATED, Indianapolis, Ind., send us a copy of the New Year's greeting with which they have been favoring their friends in the trade. It consists of a poster picture entitled "Marguerite," and is handsomely lithographed in colors. The picture shows the lady with a jewel box which has evidently just been opened and strings of pearls are conspicuously displayed, one of them being wound about her wrist. The company takes occasion to caution the trade not to be tempted by the "imitation" when the real article can be obtained by addressing it, having reference of course to its various lines of saws. Accompanying the picture poster is an announcement that the friends and patrons of the company can make the acquaintance of "Marguerite" through securing a copy without lettering, which will be forwarded to any address on receipt of 50 cents to cover the cost of the picture, packing, &c.

SAMUEL H. FRENCH & CO., Philadelphia, Pa., are extending to their friends in the trade their sixty-second annual greeting in the shape of a memorandum calendar for 1906. It is provided with a pivoted metal eye for hanging up and is of the general shape and style as those which the company has been sending out for a number of years past. Each leaf is divided into spaces for one week, with the name of the month appearing across the top. Above this is the name and address of the company, with an indication of the lines of goods manufactured. The printing is in colors, and the entire makeup is neat and attractive. Among the leading specialties of the company may be mentioned paints, colors, cement, enamels, fireplace goods, grates, mortar colors, mantels, plaster, varnishes, tile, japans, lead, zincs, &c. The piece of cardboard which forms the back of the pad carries a list of classified mail matter with rates, and there is also a calendar for 1906 and for the first half of 1907.

S. C. JOHNSON & SON, Racine, Wis., make a very interesting announcement in another part of this issue regarding Johnson's prepared wax, which is referred to as "a complete finish and polish for all wood." Attention is also called to the little book entitled "The Proper Treatment for Floors, Wood Work and Furniture," a review of which appeared in our last issue. Any one who is interested can obtain a copy of the book free of charge. Messrs. Johnson & Son are large manufacturers of ornamental hard wood floors and they will also send upon application a free catalogue showing many beautiful and new designs. Johnson's polishing mitt is their latest device for polishing furniture and wood work with wax. It is made of sheepskin and is sent free for the label from a 1-pound or larger can of Johnson's prepared wax.

THE DIVINE WATER MOTOR COMPANY, Utica, N. Y., makes the announcement that a number of changes have lately been made in the Divine water motor and that hereafter the device will be known as the Divine Red Devil water motor. It will be finished in carmine red, packed with blue buffing wheel and beveled emery wheel, with cake of polish, pulley and a bracket for holding the articles to grind or polish. Some of the improvements which have been made consist in extending the width of the case so as not to have any back motion in discharging the water, reducing the size of the buckets, and putting on a wing nut instead of the ordinary square nut as has been used heretofore. These improvements, it is claimed, make the motor very much more durable, and that on an 80-pound pressure it develops 5300 revolutions a minute.

THE L. S. STARRETT COMPANY, Athol, Mass., maker of fine mechanical tools, announces that it has purchased the leveling instrument and transit business of the Richardson-Oliver Company, Athol, Mass., formerly C. F. Richardson & Son, who for many years made a line of leveling instruments adapted for the use of architects, carpenters, stone masons and others. The Starrett Company will hereafter produce and market these tools in connection with its present extensive line.

THE folding building bracket which is being introduced to the trade by A. H. Danforth, Monson, Mass., is a device of special interest to carpenters, builders, roofers, &c. The bracket is of such a nature that it may be used in any place where a scaffold is needed on the sides of a building. It is made of 2 x 3 spruce timber and 1 x ¼ inch steel on both sides of the bracket, the whole being bolted together with round head slotted bolts. The folding bracket is meeting with great favor wherever introduced and the manufacturer states that thus far he has had no complaints of any breaking or giving out. A circular which he has issued describes the bracket and shows it as it appears in use and also folded.

No. 0575.

WADDELL MFG. CO.,

Corner Taylor and Coldbrook Sts.,
GRAND RAPIDS, MICH., U. S. A.

Manufacturers of

Wood Carvings

Hand and Machine Carvings, Mouldings, Festoons, Newel Posts, Head Blocks, Rope and Twist Balusters and Ornaments.

Almost 1,500 designs illustrated in our new catalogue and price-list No. 20. Mailed for 15c. in stamps.

Going to Build?

OUR CATALOGUE #25 WITH PLANS AND PLATES TELLS YOU ALL ABOUT IT. 800 PAGES, 6000 DESIGNS.

SEND 20¢ FREE FOR POSTAGE

THE FOSTER-MUNGER CO., CHICAGO, U.S.A.

HARDWOOD VENEERED DOORS, ART GLASS, BLINDS, COLONIAL COLUMNS, PORCH WORK, SASH, ETC.

GRILLES, MANTELS, STAIRS, WOOD-CARPET.

COLONIAL COLUMNS

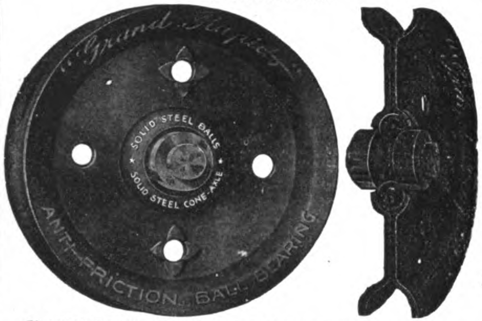
ANY SIZE OR DESIGN

JOINTS DON'T OPEN

AMERICAN COLUMN CO. LTD.
BATTLE CREEK MICH.

CATALOG FREE

PATENT PENDING.



"Ball-Bearing" Grand Rapids All-Steel Sash Pulleys

Are sold DIRECT to BUILDERS, CONTRACTORS and MILLS,

At prices under the common ordinary goods.

If you make ten or ten thousand window frames, we can save you money and give you a superior sash pulley. We are the largest sash-pulley makers in the world. We ship direct, or through dealers and jobbers everywhere.

Write for catalogue and free samples and prices on half-gross, gross, barrel or any quantity.

Direct from the Makers to you. Inquiries welcome.

GRAND RAPIDS HARDWARE CO.,
3 PEARL STREET, - - - GRAND RAPIDS MICH.

Copper Cable Chain

THOMAS MORTON,

169 Elm Street, New York.

Copper Cable, Champion Metal,
Steel Cable, Steel Champion,

SASH CHAINS.

CHAINS

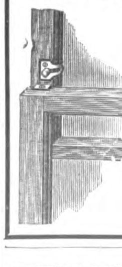
For Suspending Heavy Doors, Gates, etc.
All of SUPERIOR QUALITY.

Champion Metal Chain

SPECIAL OFFER TO CARPENTERS

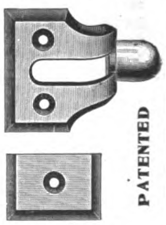
BUILDERS AND OWNERS OF HOMES

Ives Patent Window Ventilating Lock, a Safe-Guard for Ventilating Rooms, Pure Air, Good Health and Rest Assured.



To introduce this article, Four Ventilating Locks in genuine Bronze, Brass or Antique Copper Finish will be mailed to any address prepaid for One Dollar. Will include a forty page Hardware Catalogue and Working Model to Carpenters who wish the agency to canvass for its sale. Address

THE H. B. IVES CO. NEW HAVEN, Conn., U. S. A.



PATENTED

No. 225—48x12 inches, **$3.60.** Retail value, $7.00.

No. 230—48x14 inches, with Curtain Pole, **$4.50.** Retail value, $9.00.

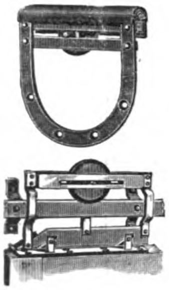
Others from $2.50 up. Largest assortment. Division Screens and special Grilles to order.

Grilles "Direct from Factory" Mantels

TILE of Every Description, for Walls and Floors. Ceramic Mosaic-Enamels, etc.

$13.25 buys this solid oak Mantel, 80 in. high, 54 or 60 inches wide, 28 x 16 Mirror. Heavy columns and elaborate capitals. Tile facing and hearth. Plated Club House Grate, $10.00.

Write for catalog of Mantels, Grates, Tiles for floors and baths, Slate Laundry Tubs, Grilles, etc. It is free. Or send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from **$12** to **$200.** **W. H. OSTENDORF,**
2417 N. Broad St., Philadelphia, Pa.



Lane Barn Door Hangers

Give best satisfaction. We are the originators and largest makers of U-shape hangers.

"LANE'S STANDARD"

is the original steel single rail . . PARLOR DOOR HANGER

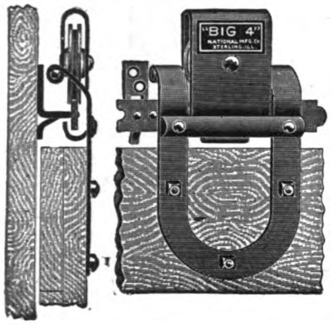
The most popular hanger to-day—because it is *all* steel and substantially and well built on correct mechanical principles.

—IT GIVES SATISFACTION.—

Sold by Hardware Trade. Send for circulars to

LANE BROTHERS CO.,

423-455 Prospect St., - - - POUGHKEEPSIE, N. Y.



"BIG 4" FLEXIBLE DOOR HANGER.

Anti-Friction. Cannot Jump the Track.
Exclusive Sale Given.

NATIONAL MFG. CO.,
STERLING, ILL.

Carpenters and Builders, Attention

Our large catalogue is now ready to be sent to you. If your name is not on our mailing list ask us for this book.

This is the most complete SASH and DOOR catalogue with *net prices* ever published.

The Carpenter who uses our prices in figuring his work will surely get the job.

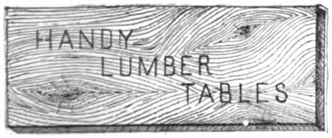
Write to-day. Don't put off.

SCHALLER-HOERR COMPANY,
CHICAGO, ILL.

Grand Rapids Wood Carving Co.,

GRAND RAPIDS, MICH.

Catalogue on application.



CONTAINING—
Board Measure - Plank Measure
Scantlings Reduced to Board Measure
WITH OTHER—
Useful Data and Memoranda
12mo. Bound in Neat Paper Cover
PRICE 10 CENTS, POSTPAID
David Williams Co., 14-16 Park Place, N. Y.

CARPENTERS

Young men desiring to fit themselves for paying positions as Carpenters should fill out and send this advertisement to us to-day and receive our 200 page handbook (FREE) describing our Carpenters' course and over 60 others, including Electrical, Mechanical, Steam and Civil Engineering. Heating, Ventilation and Plumbing, Architecture, Contractors and Builders, Architectural Drafting, Mechanical Drawing, Telephony, Telegraphy, Textiles, etc.

American School of Correspondence
Chicago, Ill.

Name...
Address...
City and State................ ....
C. & B. 2-06

RAYMOND'S COMPRESSED-LEAD SASH-WEIGHTS

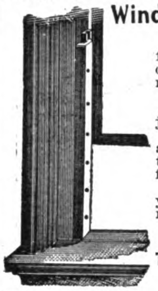
With Wrought and Malleable Iron Fastenings. The only Lead Weight made with Secure Fastenings.

SMOOTH FINISH.

Twice the heft of Iron. Occupy only half the space. No Friction. No Noise. Each Weight centered, making it hang perfectly true and plumb. Indorsed by all the leading Architects and Builders. Prices no higher than the ordinary Cast-Lead Weights. Send for Circular. Orders filled at sight.

RAYMOND LEAD CO.,
LAKE and CLINTON STS., - CHICAGO, ILLS.

King's Automatic Weather Strip.
Window and Door Stop.



The only perfectly satisfactory weather strip, window and door stop on the market.

Keeps out cold and dust.

Makes a perfectly tight joint.

Windows can be raised and lowered to desired position without the use of fasteners or of weights.

Do not build a house until you have investigated the merits of these strips.

Write for prices.

MANUFACTURED BY
The King Manufacturing Co.
Newton, Ia.

Key to the Steel Square

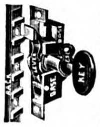
It is a wonderful instructor. It instantly gives the figures to use on the common steel square for the lengths, cuts and bevels for all rafters. It also gives the figures to use for all polygonal miters, hopper cuts, etc. Size, three inches in diameter, complete with book of instruction, all in morocco case suitable for the pocket. Can be consulted at a moment's notice.

Price, post paid, $1.50

Send express or money order to

ALFRED W. WOODS
109 So. Tenth St. Lincoln, Neb.

HUBBARD'S WINDOW SASH LOCK



Not merely a catch but a lock. Stops burglars, rattling sash, wind and rain. It does all this and is out of sight. Safe for ventilation, etc.

$3.00 Per doz. 25c. Each

Liberal offer. Canvassers wanted.

For terms, circulars, etc. apply to

D. S. HUBBARD, SON & CO.
259 Third Ave., Bay Shore, N. Y.

LORENZEN MANTELS AND GRILLES

Also contractors for Ceramic Mosaic and Tiles, Interior and Decorative Marbles, also manufacturers of Improved Scagliola for Bathrooms, Vestibules and Interior of Lobbies and Corridors in Banks, Libraries, Hotels and Public Buildings.

To Carpenters and Builders. FREE.

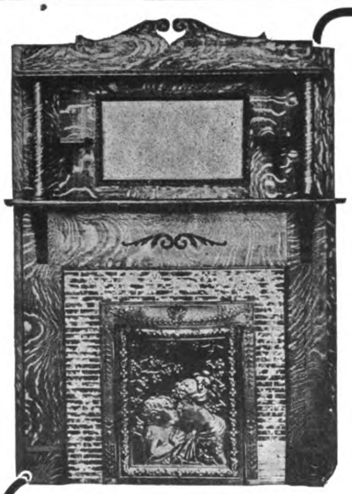
We will mail our large, handsome 96 Page (10 x 12) Catalogue, the largest Mantel and Grille book ever published, which costs us nearly 50 cents. Send us your business card and we will show you a way to make money by becoming our sales agent for your territory.

Write To-day.

CHAS. F. LORENZEN & CO., Inc
253 North Ashland Ave., Chicago.

We have just shipped a carload of our Mantels and Interior Finish to the United States Legation Buildings, Pekin, China.

LORENZEN PAYS THE FREIGHT



A BARGAIN.

THE AWB CO.

QUARTERED OAK MANTEL

with veneered quartered oak columns,
BEVELED PLATE MIRROR
polished and rubbed finish, tile facing (slabbed), and steel summer front.

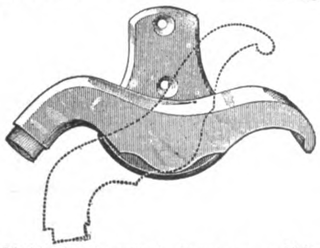
We will deliver this mantel anywhere East of the Mississippi River for . . **$18.00**

Write to-day for 40-page Catalogue showing full line.

The A. W. Burritt Co.
"THE MANTEL FOLKS"
400 Knowlton St., Bridgeport, Conn.

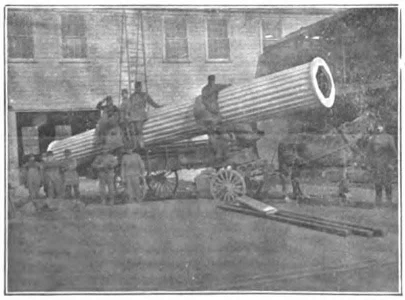
Address Dept. A.

EMPIRE DOOR HOLDER IMPROVED



Holds the heaviest doors on polished floors. 50% greater pressure than any other. Easy to put on, easy to use; the toe operates it. Write for circulars to

CALDWELL MFG. CO.,
5 Jones Street, Rochester, N. Y.



THE LARGEST LOCK JOINT COLUMN EVER BUILT.

40½" in diameter, 33-10 in. long.

One of four furnished by us for the Portico of the Allenhurst Club, Allenhurst, N. J.

HARTMANN BROS. MFG. CO.
Mt. Vernon, N. Y., U. S. A.
New York Office: 1123 Broadway.
Also
Henry Sanders Co., Chicago, Ill.
A. J. Koll Planing Mill Co.,
Los Angeles, Cal.

MANUFACTURERS OF
KOLL'S PATENT LOCK JOINT COLUMNS FOR PERGOLAS, PORCHES OR INTERIOR USE.
Send for Catalogue D 19.

EVERY Builder who reads, investigates and progresses will have a copy of Kidder's Strength of Beams, Floors and Roofs. $2.00 prepaid.
DAVID WILLIAMS CO., 14-16 Park Place, N. Y.

THE FORBES FURNACE

You run no risk in putting in the Forbes Furnace.

Every one guaranteed if properly installed. No sheet iron drums—entirely cast iron radiating tubes ½ inch thick. Will wear for years.

Send for new catalogue and full particulars.

TUBULAR HEATING AND VENTILATING CO.

228 QUARRY ST., PHILADELPHIA PA.

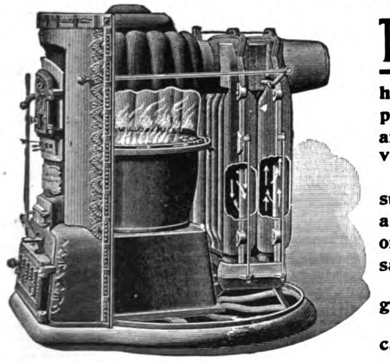
IF IT'S TO BE HEATED, SPECIFY
"MADE BY THE

International Heater Company"

WARM AIR FURNACES AND COMBINATION HEATERS, STEAM and HOT WATER BOILERS and TANK HEATERS.

NEW YORK, 1 Madison Ave.
UTICA, N. Y.
CHICAGO, 48 Dearborn Street.
BOSTON, 198 Spruce St., Chelsea.

THE BEST IS THE CHEAPEST



The BENGAL FURNACE

has stood the crucial tests imposed upon it in various places and always came out the victor.

The best evidence of its superiority is that imitators are trying to sell their wares on the merits of the BENGAL, saying it is "just as good."

There are none "just as good."

Full particulars on application.

THE FLOYD-WELLS CO., - Royersford, Pa., U. S. A.

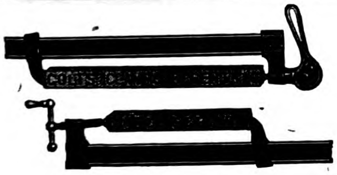
$49

LEADER

Steel Furnace

THIS No. 45 Leader Steel Furnace will heat uniformly a 7 or 8 room house, a good sized store, a school, or small church. It is durable, strong, compact. Has steel body with galvanized iron casing. Works easily with coke, hard or soft coal or wood. Has brick fire box. It costs $49, freight paid, east of Omaha. We furnish also plans of your house so you yourself can set up the furnace with its pipes, registers, smoke pipe, etc. Hundreds of people have done it—you can. Write for our new illustrated instruction book on furnaces, "Modern Furnace Heating." It's free. It's valuable. Do it now.

HESS WARMING &
VENTILATING CO.,
709 Tacoma Building,
CHICAGO, - ILLINOIS.



I & U Shaped Steel Bar

Any Length Desired.

QUICK ACTING. TIME SAVING.

Catalogue free.

BATAVIA CLAMP CO.

23 Center Street, BATAVIA, N. Y.

Furnace $10 Down, and no profit until you are satisfied. Save $50. Set up your own furnace. Thousands do this, as it's marvelously simple and we furnish the tools. 'Instructor' free, if this paper is named.
SCHAFER FURNACE CO., - Youngstown, O.

ARCHITECTURAL DRAFTSMEN

Young men desiring to fit themselves for paying positions as Architectural Draftsmen should fill out and send this advertisement to us to-day and receive our 200 page handbook (FREE) describing our Architectural Drafting course and over 60 others, including Electrical, Mechanical, Steam and Civil Engineering, Heating, Ventilation and Plumbing, Architecture, Mechanical Drawing, Telephony, Telegraphy, Textiles, etc.

American School of Correspondence
Chicago, Ill.

Name..

Address..

City and State..

C. & B. 2-06

A NEW BOOK REPRINTED
FROM
CARPENTRY and BUILDING

Plank Frame Barn Construction

A neat cloth bound manual with ample description and illustration.

Contains some good examples in framing which will interest all builders and carpenters

Fifty Cents, Postpaid.

DAVID WILLIAMS CO., Publishers,
14-16 Park Place, New York.

For Finishing or Refinishing Floors, Woodwork and Furniture

You should use Johnson's Prepared Wax, if you want the best results. This wax has been on the market for years. It has stood the most severe test and is now known as the "World's Standard." Johnson's Prepared Wax produces a beautiful artistic finish to which dust and dirt will not adhere. It does not crack or peel off. Heel marks or scratches will not show. Johnson's Wax contains more polishing wax to the pound than any other. That's why it covers the most surface, gives the best, most lasting and elegant finish with least effort. Try it and you will be convinced of its superiority.

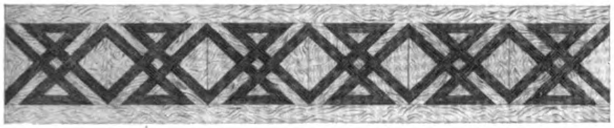
USE JOHNSON'S PREPARED WAX

"A Complete Finish and Polish for all Wood"

It comes in paste form, is applied with cloth and polished with Johnson's Weighted Brush or Johnson's Polishing Mitt. Sold by all dealers in paint—½ lb. cans, 30 cents each, 1 and 1b. cans, 60 cents per pound; 4, 5 and 8 lb. cans, 50 cents per pound.

Johnson's Hardwood Floors

We are large manufacturers of ornamental hardwood floors and will be pleased to send you upon request our free catalogue, showing many beautiful and new designs. Hardwood floors are far ahead of other floors—they are sanitary, durable, attractive and in demand. Don't delay—write us today. We carry a large stock and can ship promptly, anywhere.



Ask for book, "The Proper Treatment for Floors, Furniture and Woodwork." Tells all about wood-finishing. It's FREE. Mention edition C B 2.

S. C. JOHNSON & SON, = = Racine, Wis.

"The Wood-Finishing Authorities"

"Forstner" Brace and Machine Bits

For Fine Carpenter, Cabinet and Pattern Work

Specially Adapted for Hardwood Working.

The Forstner Labor-Saving Auger Bit, unlike other bits is guided by its *Circular Rim* instead of its centre; consequently it will bore any arc of a circle and can be guided in any direction regardless of grain or knots, leaving a true polished surface. It is preferable and more expeditious tnan chisel, gouge, scroll-saw, or lathe tool combined, for core-boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon moulding and mortising, etc.

Manufactured by

The Progressive Mfg. Co., Dept. "A", Torrington, Conn.

Enquire of your Hardware Dealers or write us direct. Supplied in Sets. Write for Catalogue.

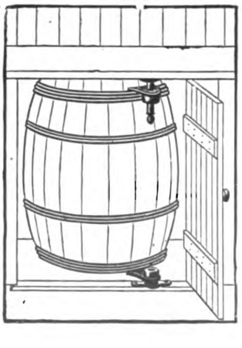
Extra Money for the Carpenter

is quickly and easily made installing the

PERFECTION BARREL SWING

It will adjust to and swing any barrel—no matter how heavy. No more trouble removing moulding board or getting at flour—simply swing barrel out. Nothing better for pantry or cupboard—a child can use it. Simple and practical. If your Hardware dealer won't furnish them send to us.

THE LEAVITT MACHINE CO., Sole Mfrs., Orange, Mass.



Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

The Carpentry and Building Series of Designs

Comprises four books, each complete in itself and sold separately. Every Volume has two-hundred or more pages, elegantly printed and bound in heavy paper with tasteful cover designs.

The titles and range of cost:

No. 1

COTTAGE DESIGNS WITH CONSTRUCTIVE DETAILS, 600 to 1,500 Dollars and upward. **Price, $1.00.**

No. 2

LOW COST HOUSES WITH CONSTRUCTIVE DETAILS, 750 to 2,500 Dollars and upward. **Price, $1.00.**

No. 3

MODERN DWELLINGS WITH CONSTRUCTIVE DETAILS, 2,000 to 5,000 Dollars and upward. **Price, $1.00.**

No. 4

SUBURBAN HOMES WITH CONSTRUCTIVE DETAILS, 3,000 to 10,000 Dollars.
Price, $1.00.

The contents include full-page half-tone views, floor plans and constructive details of selected examples of suburban homes, such as are being built at the present time.

These books afford a most pleasing variety of designs, and will prove suggestive and useful to architects, builders and contractors, as well as to all who have an interest in the idea of home building.

$1.00 each, Postpaid

David Williams Company
PUBLISHERS
14-16 Park Place
NEW YORK

The Chas. A. Strelinger Co.

has become famous the world over for supplying the best of tools, machinery and supplies. This fame has been secured through the world wide introduction of their catalogues—cuts of which appear below—to almost every mill and machine shop everywhere.

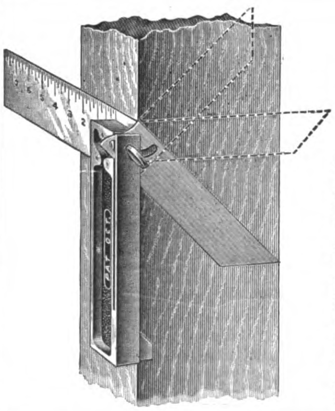
Carpenters & Wood Workers need this one.

Machinists & Metal Workers should have this one.

If you should be without them—very few now are—send 25c. apiece to

The Chas. A. Strelinger Co.
Detroit, Mich., U. S. A.
Box B.

SOMETHING NEW

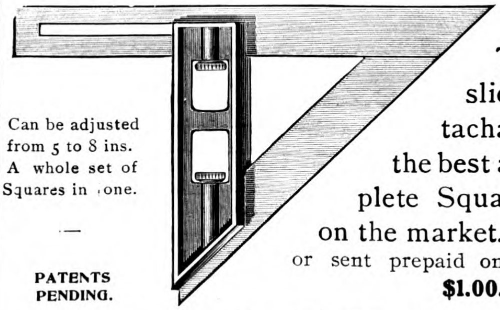


Ideal Bevel Try Square

By having this combination try square you save time, also the price of one tool. You can see by cut how easy it is to change the bevel blade to any desired position to make the square and bevel cut with one stroke of the pencil.

NICHOLLS MFG. CO., OTTUMWA, IOWA.

The Fox Square and Miter Improved



Can be adjusted from 5 to 8 ins. A whole set of Squares in one.

PATENTS PENDING.

This tool with sliding and detachable blades is the best and most complete Square and Miter on the market. Of your dealer or sent prepaid on receipt of price, **$1.00.**

P. L. FOX, M'f'r,
432½ William Street - - BRIDGEPORT, CONN.

FAR AHEAD for smooth, easy work and holding edge, will be YOUR VERDICT ON TRYING

CHAPLIN'S IMPROVED PLANES

Patented Feb. 14, 1899; Oct. 30, 1900; Dec. 24, 1902.

We want you to have a copy of our booklet, just issued,

"A 'PLANE' TALK ABOUT A GOOD PLANE!"

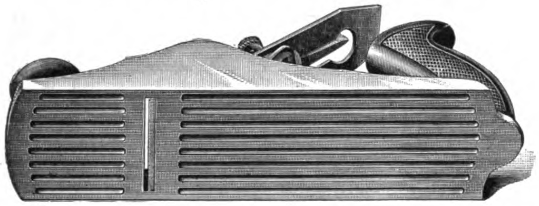
We want you to have a copy, for it is a booklet you really need in your business.

We'll gladly send you this booklet with our compliments, promptly upon receipt of your request.

May we send you a copy?

TOWER & LYON COMPANY,
95 CHAMBERS STREET, NEW YORK.

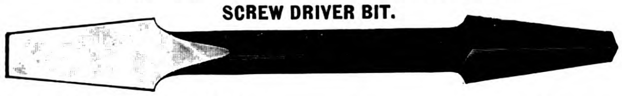
We Invite the



Severest Comparative Tests.

DEMAND and be sure to get THE VICTOR

SCREW DRIVER BIT.



It is the Best that money can buy. Each one carefully hardened and tempered by itself. Examined, Tested and *Guaranteed Perfect.*

Drop Forged in assorted sizes.

KRAEUTER & CO.,
NEWARK, N. J.

CLAMPS

Hargrave's Tools

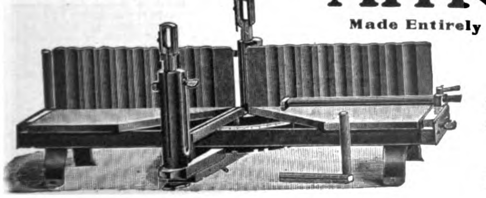
BEST QUALITY. FINISH. DESIGN.

Specify these goods to your dealer. **TAKE NO OTHER.** Write for Catalogue No. 200.

THE CINCINNATI TOOL CO.,
Norwood. CINCINNATI, O.

GOODELL MITRE BOX

Made Entirely OF STEEL.



No More Breaking.

Most desirable Box on the market, being way ahead in quality and improvements.

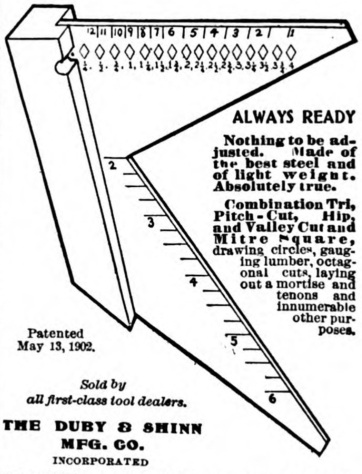
Send for Folder.

GOODELL MFG. CO.,
GREENFIELD, MASS.

New Universal Square.

Made in Three Sizes

No. 1	6 inches	-	$0.65
No. 2	10 inches	-	1.00
No. 3	13 inches	-	1.50



ALWAYS READY

Nothing to be adjusted. Made of the best steel and of light weight. Absolutely true.

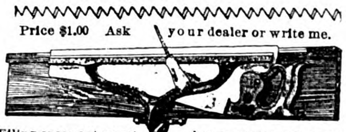
Combination Tri, Pitch-Cut, Hip, and Valley Cut and Mitre Square, drawing circles, gauging lumber, octagonal cuts, laying out a mortise and tenons and innumerable other purposes.

Patented May 13, 1902.

Sold by all first-class tool dealers.

THE DUBY & SHINN MFG. CO.
INCORPORATED
Nelson Bldg. 19 Park Place New York City

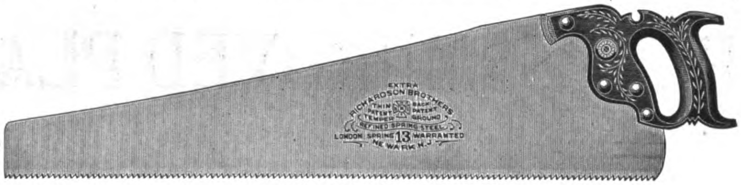
Price $1.00 Ask your dealer or write me.



Filing cross cut saws has no terrors when you use the Scientific Saw Holder. Patented Aug. 16, 1904.

T. D. GAYLE, - Council Bluffs, Iowa.

OLD RELIABLE RICHARDSON SAWS.

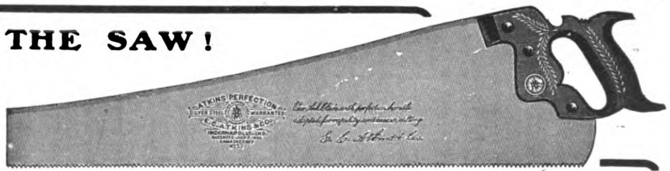


ESTABLISHED 1860.

The peer of them all. Try one and be convinced. Every saw fully warranted.

NATIONAL SAW CO. Operating Richardson Bros. **NEWARK, N. J.**

THE MAN BEHIND THE SAW!



Behind a Hand Saw stand:—
The man who makes the steel;
The man who tempers and hardens it;
The man who grinds it;
The man who finishes it, and
The man who uses it!

Behind the **Atkins Celebrated Silver Steel Hand Saws** stand the most skillful workmen among saw makers anywhere and the best carpenters who want the best tools and know them when they see and use them.

ATKINS ALWAYS AHEAD.

E. C. ATKINS & CO., Inc.,
Factories: - - INDIANAPOLIS, IND.

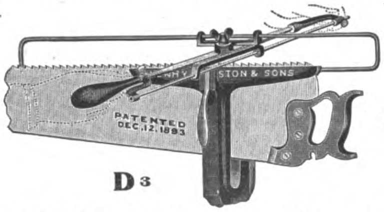
BRANCH HOUSES:—No. 64 Reade Street, New York City. Memphis, Tenn. Atlanta, Ga. Minneapolis, Minn. Portland, Ore. Seattle, Wash. Chicago, Ill. Toronto, Ont.

WRITE FOR OUR FREE CARPENTER'S TIME BOOK.
Mention this paper.

DISSTON Filing Guide and Clamp.

Especially Designed to assist those not skilled in the art to file a saw correctly.

IT'S PRACTICAL
SEND FOR
DESCRIPTIVE
CIRCULAR.



THIS GUIDE IS
FITTED TO THE
DISSTON Nos. 2 and 3
CLAMPS.

HENRY DISSTON & SONS, INC.,
KEYSTONE SAW, TOOL, STEEL & FILE WORKS,
PHILADELPHIA, PA.

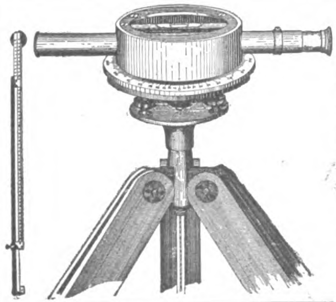
Try "Best" Spring Tempered Steel Edge Groovers and Center Groovers

Brass Rollers, Bronze Edge Groovers and Center Groovers, Spring Tempered Steel Edge Groovers and Center Groovers, Iron Tampers, etc.

The Most Satisfactory Cement Sidewalk Tools in the World

Write for Catalog and Price List

The Woodhouse Hdw. Mfg. Co.
2620 So. 13th St., St. Louis, Mo.

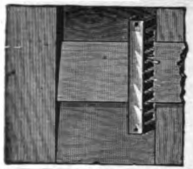


WHAT BUILDERS HAVE BEEN LOOKING FOR

BOSTROM'S Improved Builders' Level

An absolutely reliable leveling instrument for Architects, Builders, Carpenters, and Stone Masons. Can be used for any kind of foundation work and getting angles, is simple in its construction, easily understood, and can be operated by any one. Is made of Brass, oxidized, and has a silvered circle of degrees. Has achromatic Telescope of ample power for such work. Price, including Plumb Bob, Tripod and Graduated Rod and Target, $20.00. Write for circular and be convinced. Every instrument guaranteed.

BOSTROM-BRADY M'F'G CO.,
53½ West Alabama Street,
Atlanta, Ga.



NEW

CLAP-BOARD MARKER.

Cheaper and better than any on the market.

Countersink and Depth Gauge.

Send for circulars, or ask your Hardware Dealer for them.

OTIS A. SMITH, Rockfall, Conn.

An Instant Cure For Slipping Belts!

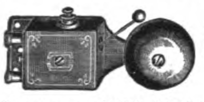
DIXON'S

SOLID BELT DRESSING.

WRITE FOR A FREE SAMPLE.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

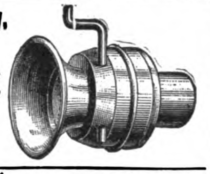
W. R. OSTRANDER & CO., 22 Dey Street, New York City,



Manufacturers of

Speaking Tubes, Whistles, Elevator, House and Hotel Annunciators and Bells, Electric Light Supplies.

Send for Catalogue.



Factory, 1431-1439 DeKalb Avenue, Brooklyn.

"Yankee" Tools.

No. 11.—RATCHET, RIGHT AND LEFT HAND AND RIGID.

No 15 —RATCHET, WITH FINGER TURN ON BLADE.

No. 30.—SPIRAL RATCHET, RIGHT AND LEFT HAND AND RIGID.

The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up to date mechanic could buy tools of their quality and character. Other tools are very good tools, but "Yankee" Tools are better. "Yankee" Tools are sold by all leading dealers in Tools and Hardware. Ask your dealer to see them. Our Yankee Tool Book tells all about them. Sent free by

NORTH BROS. MFG. CO., Philadelphia, Pa.

A TOOL THAT'S STAMPED

STANLEY

IS THE BEST OF IT'S KIND

IMPROVED CARPENTERS' TOOLS

Sold by all Hardware Dealers

Stanley Rule and Level Co.

NEW BRITAIN, CONN., U. S. A.

A COMPLETE FRAMING RULE

ON

NICHOLLS FRAMING SQUARE.

On the square is where the carpenter wants his figures, not in a book or on a piece of paper, as they are usually lost.

NICHOLLS MFG. CO.,

OTTUMWA, IOWA.

We have **now ready** our

NEW ILLUSTRATED CATALOGUE No. 19

devoted exclusively to

Wood Workers' Tools.

Containing **250** pages, **1100** illustrations, handsomely printed on good paper, it makes a convenient and valuable book for **all woodworking mechanics.**

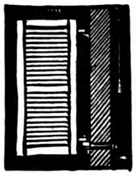
Sent to any address on receipt of 10 cents postage.

Wm. P. Walter's Sons,

TOOL HEADQUARTERS

1233 Market St., Philadelphia.

Mallory Shutter Worker.



Works and locks the blinds from the inside. Ornamental, durable, perfect working. Applicable to old or new buildings.

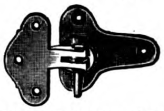
Manufactured by

MALLORY MFG. CO.,

Flemington, N. J.

Automatic Blind Hinges

HALE & BENJAMIN'S PATENT



Flush and surface for wood and brick building. Easy to put on, strong and durable. Warranted. Also combination awning hinges. With these hinges blinds will not slam or blow off. They are the only hinges adapted to bay or mullion windows, as they require no other fixtures. Testimonials on request from dealers, contractors, and people who have used them several years. We are the sole owners of these two patents. If your dealer does not keep them write to

PARKER WIRE GOODS COMPANY,

Manufacturers,

No. 1 Assonet Street, Worcester, Mass.

Use Our

Folding and Adjustable

Handle Draw Knife!

It is adjustable to any position, adaptable to the awkward places, absolutely rigid when set, handy and compact, a time saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

Write for Prices and Discounts.

A. J. WILKINSON & CO.,

180-188 Washington St., Boston, Mass., U.S.A.

The Rich Handy Drawing Outfit

Saves Time

for the draughtsman, and is a great aid to the learner. It holds a number of sheets or a pad, which requires no fastenings. **The Protractor T Square** gives accurate angles. You get measurements direct from the board. Has a drawer for instruments, and can be carried around to make drawings on the spot. Circulars free.

J. & G. RICH, 122 N. 6th St., Phila., Pa.

Send for Catalogue No. 62

Giving description of books on Architecture, Building, Engineering and allied subjects. Sample of "Architects & Builders Magazine" sent on request.

Published monthly at $2.00 a year.
Foreign Subscriptions, $3.00 a year.

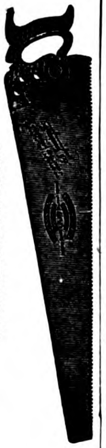
WM. T. COMSTOCK, Pub., 23 Warren Street, N.Y.

PICTURE LIGHTING

is a distinct branch of the lighting business. We have lighted more galleries and individual pictures than any other concern in the country. Investigation invited.

I. P. FRINK, 551 Pearl St., New York.

A 7½ HAND SAW



This is not a PRIZE but a JEWEL. If your dealer cannot furnish you one of our CELEBRATED NARROW A 7½ HAND SAW, 6 inch at butt, 1½ inch at point, 4 gauges thin on back, send us P. O. Order for $2.00 and we will send, express prepaid, 26 inch SAW in Canvas Scabbard.

C. E. JENNINGS & CO.,
101 Reade Street, NEW YORK.
SOLE MANUFACTURERS.

STRATTON BROS.

CARPENTERS', MACHINISTS', MASONS' Improved Spirit **LEVELS**

Send for New Catalogue D-Q.

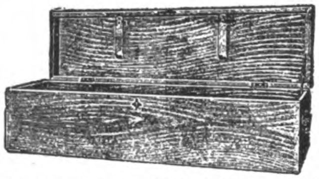
R. O. STETSON, Manufacturer,
Greenfield, Mass.

STANDARD FOR 30 YEARS

This name stamped on every three feet is a guarantee that you are getting the best sash cord that can be made.

SILVER LAKE CO.,
Boston, Mass.

Shoulder Tool Chest



Inside Dimensions
32x8x8

$2.50

An unusual bargain for this high grade tool chest; made of selected chestnut, with strong lock, drop handles. saw rack and tray.

WE MANUFACTURE THE CELEBRATED WIRANCO TOOLS. If you have not already used them begin now and you will be surprised at the saving in cost and the satisfaction derived from using tools of high quality.

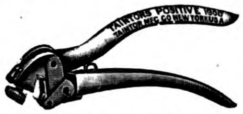
Our New 600 Page Catalog No. 90 gives full description and prices of tools, work benches, &c. Contains a greater variety and a number of new lines not found in the old one. No mechanic should be without it. **PRICES LOWER THAN EVER.** Write for it to-day.

Oldest Mail Order House in America. Established 1816.

White, Van Glahn & Co.

14 CHATHAM SQUARE, NEW YORK CITY

TAINTOR
Positive Saw Set



TRY IT If you like it tell others
If you don't like it tell US

Send for our circular which contains HINTS on the

CARE of SAWS

Free on application.

TAINTOR MFG. CO.
113 Chambers St., New York

MONARCH
Sash Chain

IS THE BEST.

Samples free. Mention this paper.

The Bridgeport Chain Co.
Bridgeport, Conn.

SAMSON SPOT CORD

Distinguished by our trade-mark, the Colored Spot.

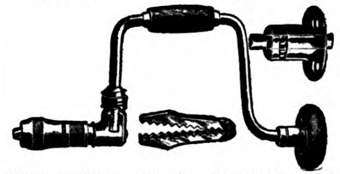
Outwears any other device for hanging windows.

SAMSON CORDAGE WORKS, Boston, Mass.

Ask for **MILLERS FALLS CO.'S BIT BRACES**

Series Nos. 30 31 32 33
14 12 10 8 inch sweep.

There are no other braces made which match them in merit and beauty of finish.



Our name appears on all genuine goods. Look for it before you buy. If your dealer does not keep Millers Falls Braces then write to us.

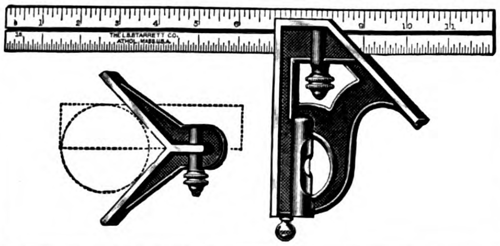
Millers Falls Company
28 Warren Street, New York, N. Y.

THE FORD AUGER BIT

FORD AUGER BIT CO., Holyoke, Mass.

The first and only Bit with Patented Concave Twist. The best Bit for all round work yet produced. It is worth your time to try one and see.

BURLINGTON VENETIAN BLIND CO.
MAKERS OF
BLINDS
AND SCREENS
BURLINGTON, VT.



Starrett Combination Square

The Original
The much Imitated

As necessary to a carpenter as a hammer.

Send for free Catalogue No. 17 P of the largest line of Fine Mechanical Tools made. . . .

THE L. S. STARRETT CO., Athol, Mass., U. S. A.

Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

Vol. XXVIII. No. 3. New York, March, 1906. Ten Cents a Copy. One Dollar a Year.

Alphabetical List of Advertisers.

American Column Co.	57
American Rolling Mill Co.	10
American School of Correspondence	5&14
American Wood Working Machinery Co.	6
Asphalt Ready Roofing Co.	1
Atkins, E. C. & Co.	66
Baker McMillen Co.	63
Barnes, W. F. & John Co.	4
Barnes Tool Co.	8
Barnett, G. & H., Co.	1
Batavia Clamp Co.	53
Berger Mfg. Co.	2
Bommer Bros.	1
Boston Bolt Co.	12
Bostrom-Brady Mfg. Co.	66
Boynton Furnace Co.	16
Bradt Publishing Co.	14
Bridgeport Chain Co.	68
Broad Gauge Iron Stall Wks	63
Burlington Venetian Blind Co.	68
Burnham, Hitchings, Pierson Co.	11
Burritt, A. W. Co.	60
Cabot, Samuel	1
Caldwell Mfg. Co.	60
Canton Steel Roofing Co.	10
Champion Safety Lock Co.	63
Chattanooga Roofing & Fdy. Co.	53
Chicago House Wrecking Co.	3
Chicago Machinery Exchange	7
Cincinnati Tool Co.	64
Cleveland Stone Co.	59
Columbia Mineral Wool Co.	16
Comstock, Wm. T.	68
Cordesman, Meyer & Co.	9
Cortright Metal Rfg. Co.	12
Crescent Machine Co.	8
Darforth, A. H.	65
Davis & Cook	63
Diamond Expansion Bolt Co	8
Disston, Henry & Sons	66
Dixon, Jos., Crucible Co.	67
Drouve, G. Co.	10
Duby & Shinn	65
Eastern Granite Roofing Co	13
Edwards Mfg. Co.	9
Eller Mfg. Co.	13
Energy Elevator Co.	15
Enterprise Fdry. Co.	7
Fay, J. A. & Egan Co.	5
Floyd, Wells Co.	61
Ford Auger Bit Co.	68
Forest City Bit & Tool Co.	63
Foster Munger Co	57
Fox Machine Co.	10
Fox, P. L.	65
French, Samuel H. & Co.	15
Frink, I. P.	68
Gage Tool Co.	16
Gem Publishing Co.	9
Globe Ventilator Co.	15
Goodell Mfg. Co.	64
Grand Rapids Hdw. Co	57
Grand Rapids Wood Carving Co.	59
Hamlin, George R.	10
Hammacher, Schlemmer & Co.	62
Hartmann Bros. Mfg. Co.	62
Hess Warming & Ventilating Co.	61
Howes, S. M., Co.	68
Hubbard, D. S., Son & Co.	59
Ideal Concrete Machinery Co.	6
Ideal Ventilator	59
Interior Hardwood Co.	1
International Cor. Schools	8
International Heater Co.	61
Ives, Hobart B. & Co.	57
Jennings, C. E. Co	68
Johnson, E. J., Co	13
Johnson, S. C., & Son	58
Kanneberg Rfg. & Ceil. Co.	13
Karol, B. C.	5
Kees, F. D. Mfg. Co	59
Keighley, S. Metal Ceiling & Mfg Co.	12
Kidder, R. E.	9
Kimball Bros. Co.	15
King Mfg. Co.	59
Kraeuter & Co.	64
Lanz, M., & Sons	6
Lane Bros. Co.	59
Leavitt Machine Co.	60
Lestershire Lumber & Box Co	63
Long Island Machinery Co.	8
Lorenzen, Chas. F. & Co.	60
McLain, F. C., Co.	61
Mallory Mfg. Co.	37
Marston, J. M. & Co.	5
Mesker & Bro.	14
Meyers, F. J. Mfg. Co.	10
Mietz, A.	15
Miller, A. W., Mfg. Co.	16
Millers Falls Co.	68
Montross Metal Shingle Co.	14
Morse, Williams & Co.	15
Morton, Thomas	57
Mullins, W. H. Co.	12
National Mfg. Co.	59
National Saw Co.	66
Nat'l Sheet Metal Rfg. Co.	14
New Jersey Zinc Co.	14
N. Y. Steel Corner Plate Co.	14
Nicholls Mfg. Co.	65&67
North Bros. Mfg Co.	67
O. K. Harry Steel Wks.	14
Ostendorf, W. H.	57
Ostrander, W. R. & Co.	67
Parker Wire Goods Co.	67
Parks Ball Bearing Machinery Co.	9
Pettyjohn Co.	7
Phila. & Boston Face Brick Co.	16
Pike Mfg. Co.	1
Progressive Mfg. Co.	62
Reed & Auerbacher Co.	16
Rich, J. & G.	67
Sackmann, F. A.	5
Samson Cordage Works	68
Schaller-Hoerr Co.	59
Scott & Co.	6
Sedgwick Mch. Works	15
Seneca Falls Mfg. Co.	4
Shimer, Samuel J. & Sons	8
Silver Lake Co.	68
Simonds Mfg. Co.	16
Smith, Otis A.	67
Smith & Egge Mfg. Co.	63
Standard Paint Co.	9
Stanley Rule & Level Co.	67
Stanley Works	1
Star Encaustic Tile Co.	14
Starrett, L. S. Co.	1&68
Stowell Mfg. Co.	11
Strelinger, C. A. Co.	65
Taintor Mfg. Co.	68
Topp, G. A. & Co.	11
Tower & Lyon	64
Truss Metal Lath Co	15
Tubular Heating & Ventilating Co	61
Union Mfg. Co.	63
U. S. Mineral Wool Co.	16
Van Dorn Iron Wks. Co.	8
Waddell Mfg. Co.	57
Walters, Wm. P. Sons	67
Warner Elevator Mfg. Co.	15
Washburne, E. G. & Co.	8
Wheeling Corrugating Co.	11
White, Van Glahn & Co.	68
Wilkinson, A. J. & Co.	67
Willis Mfg. Co.	12
Woodhouse Hdw. Mfg. Co.	66
Wood-Mosaic Flooring Co.	16
Woods, A. W.	65

Classified List of Advertisers.

Air Compressors
Mietz, A.

Annunciators
Ostrander, W. R. & Co.

Architects' Details
Lestershire Lumber & Box Co.

Asbestos
Stowell Mfg. Co.

Auger Bits
Ford Auger Bit Co.
Jennings, C. E. Co.

Awnings
Chattanooga Roofing & Fdry. Co.
O. K. Harry Steel Works

Band Saws
American Wood Working Machinery Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Crescent Machine Co.
Fay, J. A. & Egan Co.

Barrel Swings
Leavitt Machine Co.

Bath Fittings
Chicago House Wrecking Co.

Blackboards, Slate
Johnson, E. J. Co.

Blinds
Burlington Venetian Blind Co.
Foster-Munger Co.
Schaller-Hoerr Co.

Blind Hinges
Parker Wire Goods Co.
Stanley Works

Bolts and Nuts
Boston Bolt Co.

Books
Arthur, Wm.
Bradt Publishing Co.
Comstock, Wm. T.
Gem Publishing Co.
Williams, David, Co.

Boring Machines
Fox Machine Co.
Millers Falls Co.

Brackets, Building, Folding
Danforth, A. H.

Builders' Hardware
Boston Bolt Co.
Hammacher, Schlemmer & Co.

Building Brackets, Folding
Danforth, A. H.
Stanley Works
Tower & Lyon Co.

Building Material
Lestershire Lumber & Box Co.

Building Paper and Felt
Cabot, Samuel.
Standard Paint Co.

Builders' Supplies
Schaller-Hoerr Co.

Butts and Hinges
Stanley Works.

Capitals
Grand Rapids Wood Carving Co.
Waddell Mfg. Co.

Ceiling, Metallic
Berger Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Keighley, S. Metal Ceiling & Mfg. Co.
Wheeling Corrugating Co.
Willis Mfg. Co.

Cement
French, S. H. & Co.

Cisterns, Steel
O. K. Harry Steel Works.

Clamps
Batavia Clamp Co.
Cincinnati Tool Co.

Concrete Block Machines, Portable
Enterprise Fdry. Co.
Ideal Concrete Machinery Co.
Pettyjohn Co.

Conductor Pipes
American Rolling Mill.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.

Conservatories
Burnham, Hitchings, Pierson Co.

Contractors' Supplies
Boston Bolt Co.

Cornices, Sheet Metal
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mesker & Bro.
Mullins, W. H. Co.
Willis Mfg. Co.

Cresting
Van Dorn Iron Works Co.
Willis Mfg. Co.

Cutter Heads
Shimer, Sam'l J. & Sons.

Designs and Details
(See House Plans)

Door Checks and Springs
Hammacher, Schlemmer & Co.

Door Hangers
Lane Bros. Co.
National Mfg. Co.

Draw Knives
Wilkinson, A. J. & Co.

Drawing Instruction
International Correspondence Schools.

Drawing Outfits
Comstock, Wm. T.
Rich, J. & G.

Drying Stoves
Drouve, G. Co.
Howes, S. M. Co.

Dumb Waiter Fixtures
Hammacher, Schlemmer & Co.

Dynamos
Mietz, A.

Eave Troughs
Chattanooga Roofing & Fdry. Co.
Eller Mfg. Co.
Wheeling Corrugating Co.

Elevators and Dumb Waiters
Energy Elevator Co.
Kimball Bros. Co.
Meyers, F. J. Mfg. Co.
Morse, Williams & Co.
Sedgwick Machine Works.
Warner Elevator Mfg. Co.

Engines
Mietz, A.

Etching Fluid
Reed & Auerbacher Co.

Expansion Bolts
Boston Bolt Co.
Diamond Expansion Bolt Co.

Fencing
O. K. Harry Steel Works.

Files and Rasps
Barnet, G. & H. Co.
Boston Bolt Co:

Framing Tools
Topp, G. A., & Co.

Furnaces and Heaters
Boynton Furnace Co.
Floyd-Wells Co.
Hess Warming & Ventilating Co.
International Heater Co.
Tubular Heating & Ventilating Co.

Gas and Electric Fixtures
Frink, I. P.

Grates, Fancy Plated
Chattanooga Roofing & Fdry. Co.

Greenhouses
Burnham, Hitchings, Pierson Co.

Grille Work, Wood
Foster-Munger Co.
Waddell Mfg. Co.

Grindstones
Cleveland Stone Co.

Grooving Heads
Fox Machine Co.

Hardware Jobbers
White, Van Glahn & Co.

Hardware Specialties
Champion Safety Lock Co.

Hasps, Hooks and Staples
Woodhouse Hdw. Mfg. Co.

Heaters.—*Steam and Hot Water.*
Burnham, Hitchings, Pierson Co.
International Heater Co.

Heaters, Steam and Gas Combined
McLain, Frank C. & Co.

Hinges, Spring
Bommer Bros.

Hinges, Window Screen
Kees, F. D. Mfg. Co.

Hoists
Mietz, A.

House Plans
Comstock, Wm. T.

Iron House Fronts
Mesker & Bro.

Iron Work
Van Dorn Iron Works Co.

Joist Hangers
Lanz, M., & Sons.

Lath, Metal
Truss Metal Lath Co.
Wheeling Corrugating Co.

Lavatories
Chicago House Wrecking Co.

Levels
Baker, McMillen Co.
Bostrom-Brady Mfg. Co.
Davis & Cook.

Lightning Rods
Washburn, E. G. & Co.

Lumber and Shingles
Lestershire Lumber & Box Co.

Mangers, Slow Feed
Broad Gauge Iron Stall Works.

Mantels
Burritt, A. W., Co.
Foster-Munger Co.
French, Sam'l H. & Co.
Lorenzen, C. F. & Co.
Ostendorf, W. H.
Phila. & Boston Face Brick Co.

Marine Engines
Mietz, A.

Masons' Stoves
Drouve, G. Co.

Metal Lath
Truss Metal Lath Co.

Mill Work
Schaller-Hoerr Co.

Mineral Wool
Columbia Mineral Wool Co.
U. S. Mineral Wool Co.

Miter Boxes
Goodell Mfg. Co.
Nicholls Mfg. Co.

Miter Machines
Fox Machine Co.

Miters
Fox, P. L.

Moldings
American Column Co.
Grand Rapids Wood Carving Co.
Schaller-Hoerr Co.
Waddell Mfg. Co.

Mortar Colors
French, Sam'l H. & Co.

Mortisers Hand
Miller, A. W., Mfg. Co.

Ornamental Sheet Metal Work
Mullins, W. H. Co.

Ornamental Wire, Iron, Steel and Brass Work
Meyers, F. J. Mfg. Co.

Paint
New Jersey Zinc Co.
Standard Paint Co.

Parquette Flooring
Interior Hardwood Co.
Johnson, S. C., & Son.
Wood-Mosaic Flooring Co.

Patent Lawyers
Hamlin, George R.

Pencils
Dixon, Jos. Crucible Co.

Planes
Gage Tool Co.
Smith, Otis A.
Tower & Lyon Co.
Union Mfg. Co.

Plasterers' Corner Plates
New York Steel Corner Plate. Co.

Plastic Ornaments
French, Samuel H. & Co.

Plumbers' Supplies
Karol, B. C.

Porch Columns
American Column Co.
Hartman Bros. Mfg. Co.

Pumps
Mietz, A.

Reflectors
Frink, I. P.

Roofing, Art Metal Tile
Mullins, W. H. Co.

Roofing and Siding
Asphalt Ready Roofing Co.
Berger Mfg. Co.
Canton Steel Roofing Co.
Drouve, G. Co.
Eastern Granite Roofing Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Lincoln Waterproof Cloth Co.
O. K. Harry Steel Works.
Scott & Co.
Standard Paint Co.
Stowell Mfg. Co.
Wheeling Corrugating Co.

Roofing Brackets
Stanley Rule & Level Co.

Roofing Paint
Asphalt Ready Roofing Co.
Dixon, Jos. Crucible Co.

Roofing Slate
Johnson, E. J. Co.

Sash Balances
Caldwell Mfg. Co.

Sash Chains
Bridgeport Chain Co.
Morton, Thomas.
Smith & Egge Mfg. Co.

Sash Cord
Samson Cordage Works.
Silver Lake Co.

Sash Locks
Champion Safety Lock Co.
Hubbard, D. S., Son & Co.
Ives, H. B. & Co.

Sash Operating Devices
Burnham, Hitchings, Pierson Co.

Sash Pulleys
Grand Rapids Hardware Co.

Sashes, Doors and Blinds
Foster-Munger Co.
Lestershire Lumber & Box Co.

Saw Clamps
Disston, Henry & Sons.

Saw Filing Guide
Disston, Henry & Sons.

Saw Jointers
Crescent Machine Co.

Saw Sets
Taintor Mfg. Co.

Saw Tables
Chicago Machinery Exchange.
Crescent Machine Co.
Kidder, R. E.

Saws
Atkins, E. C. & Co.
Disston, Henry & Sons.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
National Saw Co.
Simonds Mfg. Co.

Schools
American School of Correspondence.
International Correspondence Schools.

Screw Drivers
Kraeuter & Co.
North Bros. Mfg. Co.

Sheet Metal Fronts
Mesker & Bro.

Shingles and Tiles, Metallic
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Cortright Metal Roofing Co.
Montross Metal Shingle Co.
National Sheet Metal Roofing Co.
Willis Mfg. Co.

Shingles Hip
Wheeling Corrugating Co.

Shingle Stains
Cabot, Samuel.

Shutter Worker
Mallory Mfg. Co.

Shutters (See Blinds)

Skylights
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Drouve, G. Co.
Edwards Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mullins, W. H. Co.
Willis Mfg. Co.

Speaking Tubes
Ostrander, W. R. & Co.

Spring Hinges
Bommer Bros.

Squares
Duby & Shinn.
Fox, P. L.
Nicholls Mfg. Co.

Steel Figures and Letters
Sackman, F. A.

Steel Square Key
Woods, Alfred W.

Stoves and Ranges
Boynton Furnace Co.

Structural Iron and Steel Works
Boston Bolt Co.

Structural Slate
Johnson, E. J. Co.

Tanks, Steel
O. K. Harry Steel Works.

Tiling
Ostendorf, W. H.
Star Encaustic Tile Co.

Tool Boxes
Walter's Sons, W. P.

Tool Cabinets
Hammacher, Schlemmer & Co.

Tool Chests
Jennings, C. E. Co.

Tools
Forest City Bit & Tool Co.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
Kraeuter & Co.
Millers Falls Co.
North Bros. Mfg. Co.
Progressive Mfg. Co.
Reed & Auerbacher Co.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S., Co.
Strelinger, C. A., Co.
Tower & Lyon Co.
Walter's Sons, Wm. P.
Wilkinson, A. J., & Co.

Turned, Molded Carved Work
Waddell Mfg. Co.

Ventilating Attachment
Drouve, G., Co.

Ventilators
Globe Ventilator Co.

Ventilators, Window
Ideal Ventilator Co.

Veranda Stock
American Column Co.

Vises
Hammacher, Schlemmer & Co.

Wagon Jacks
Batavia Clamp Co.

Water Closets
Chicago House Wrecking Co.

Wax, Finishing and Polishing
Johnson, S. C., & Son.

Weather Strips
Hammacher, Schlemmer & Co.
King Mfg. Co.

Weather Vanes
Broad Gauge Iron Stall Works.

Window Apparatus
Drouve, G. Co.

Window and Door Stops
King Mfg. Co.

Window Fasteners
Stanley Works.

Window Stop Adjusters
Ives, Hobart B., & Co.

Window Trimmings
Caldwell Mfg. Co.

Windows, Fireproof
Mullins, W. H. Co.

Wood Carving
Grand Rapids Wood Carving Co.

Wood Mantels
(See Mantels)

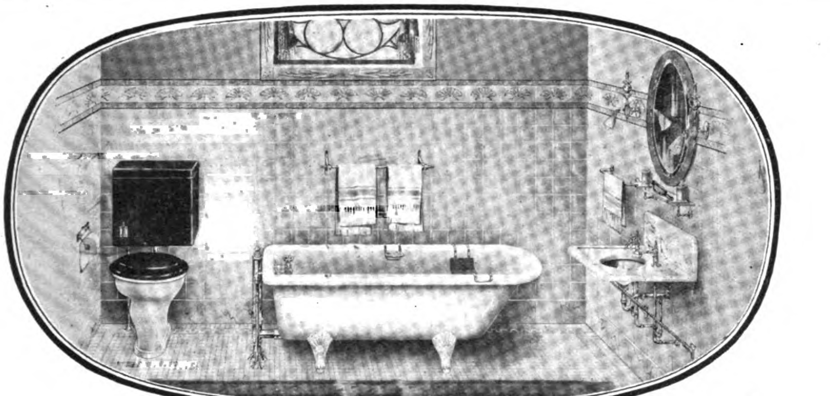
Wood Ornaments
Waddell Mfg. Co.

Wood Trimmers
Fox Machine Co.

Wood Working
Lestershire Lumber & Box Co.

Wood Working Machinery
American Wood Working Mach'y Co.
Barnes, W. F. & John.
Barnes Tool Co.
Chicago Machinery Exchange.
Cordesman Machine Co.
Fay, J. A. & Egan Co.
Fox Machine Co.
Kidder, R. E.
Long Island Machinery Co.
Marston, J. M. & Co.
Parks Ball Bearing Machinery Co.
Seneca Falls Mfg. Co.

Wood Working Machinery, Second Hand
Long Island Machinery Co.




NEW
FELT
ROOFING

Victor" Scroll Saw.

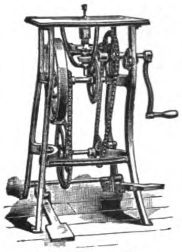
"Diamond" Mortiser.

FOOT, HAND AND POWER

WOOD-WORKING MACHINERY

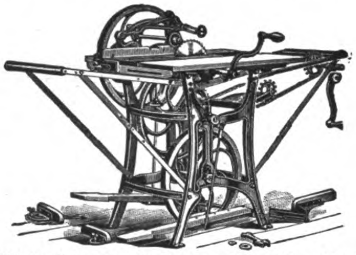
For Carpenters, Builders, Cabinet-Makers and Other Wood-Workers.

Built for Hard Work, Accurate Work and Long Service.



"Rex" Moulder.

ONE MAN with one of these machines will do the work of four to six men using hand tools; will do it easier, will do it better.



No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw.

WE GUARANTEE each machine to be thoroughly practical and accurate. Machines sent on trial, and if not found entirely satisfactory may be returned at our expense.

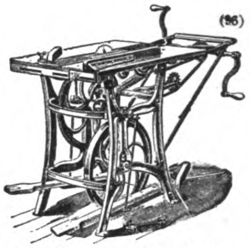
No. 8 "Union" Power Saw.

Enterprising mechanics are quick to see the superior merits of our machines. It will pay you to investigate these advantages.

SEND FOR CATALOG "A."

The Seneca Falls Manufacturing Co.

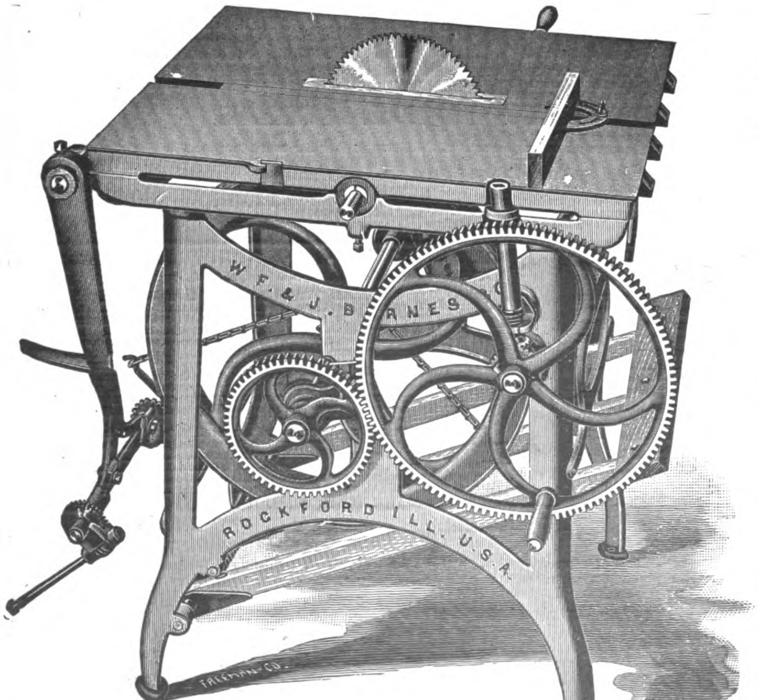
209 Water Street, Seneca Falls, N. Y., U. S. A.



(86)

No. 6 "Union" Combination Saw.

Barnes Foot and Hand Power Machinery



For CARPENTERS and BUILDERS.

Our New Hand and Foot Power Circular Saw No. 4, the strongest most powerful, and in every way the best machine of its kind ever made for ripping, cross cutting and for grooving, gaining, dadoing and rabbeting. Solid iron table planed perfectly true.

We make nine other machines for Wood Workers.

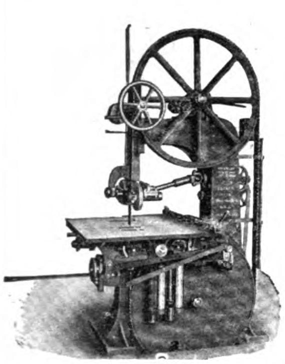
The Only Complete Line of Such Machines made.

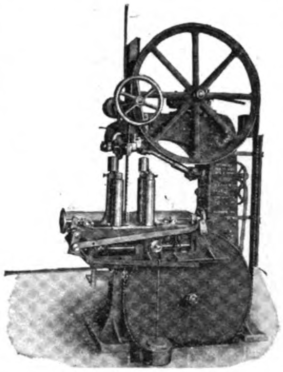
Strong,
Practical,
Durable.

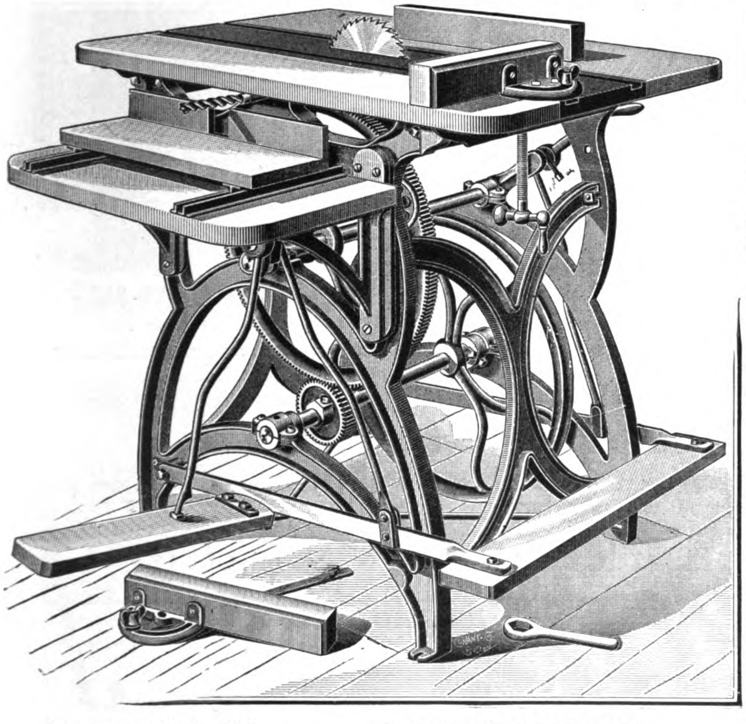
Catalogue Free on Application.

W. F. & JOHN BARNES CO.

71 Ruby St., Rockford, Ill.








CYCLOPEDIA
of
DRAWING
MECHANICAL
SHADES AND
SHADOWS
PERSPECTIVE
RENDERING
FREEHAND
LETTERING
PART 1
AMERICAN SCHOOL
CORRESPONDENCE


OHIO
F. A. SACKMANN.
61 PROSPECT ST.
CLEVELAND, OHIO.

AMERICAN MACHINES

POSSESS {FINEST QUALITY OF MATERIAL / HIGHEST GRADE OF WORKMANSHIP} **INVESTIGATE**

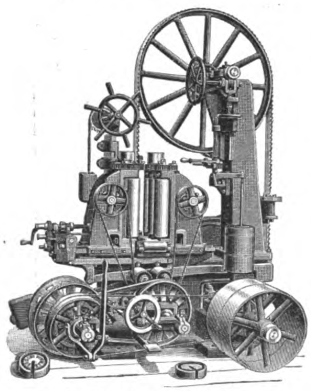


Fig. 502. Clement 48″ Band Re-Saw

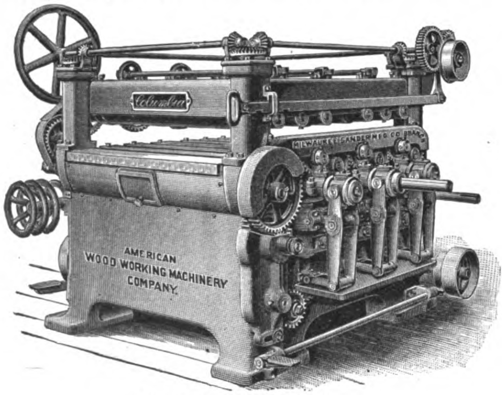


Fig. 1070. Columbia Sander

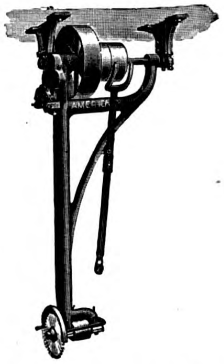


Fig. 610. Houston Swing Saw

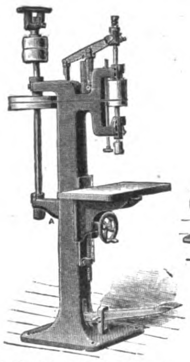


Fig. 974. No. 3 Clement Vertical Borer

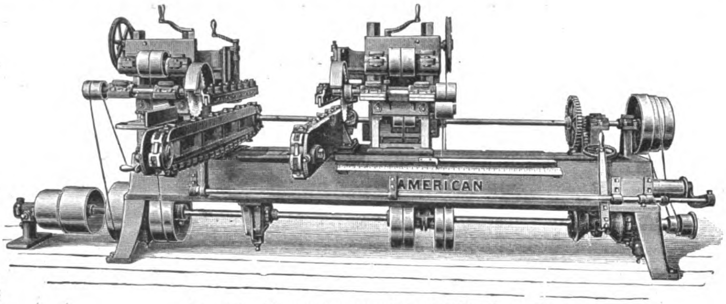


Fig. 968. Clement Improved Double End Tenoner

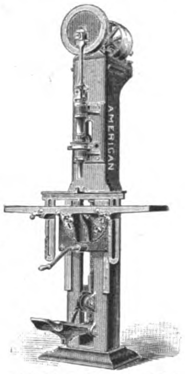


Fig. 913. Houston No Mortiser

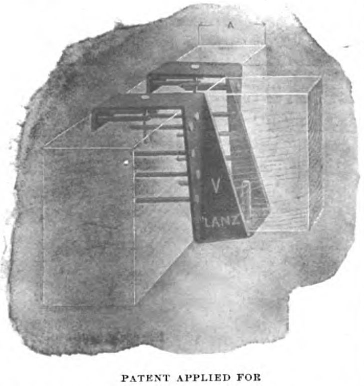
American Wood Working Machinery Co.

NEW YORK, 136 Liberty St. CHICAGO, 43 So. Canal St. NEW ORLEANS, Hennen Bldg.

Made in Pittsburgh

"Lanz" Joist Hangers and Stirrups

We court comparison. Prices attractive. Joist Hangers made to spike on, for brick-work, concrete blocks and I-beams. Write for descriptive matter 312.



PATENT APPLIED FOR

1865 M. Lanz & Sons 1906
Pittsburgh, Pa.

Simplicity, Rapidity Adaptability, Durability

ARE THE **FOUR CARDINAL POINTS**

Combined in

NO Wheels, Chains, Cogs, Gears or Cranks. Nothing to Clog, Break or get out of order. No loss of time or labor.

The Ideal Hollow Concrete Block Machine

"The Peer of All"

Manufactured by

Ideal Concrete Machinery Co.

Formerly Aurburn, Ind. **South Bend, Ind.**

Handsome Catalog and Booklet for the asking.

Face formed on bottom of the mould. Cores withdrawn horizontally by lever —not by hand. **Guaranteed** capacity, two men, 10 hours, 200 blocks. A portable machine that can be carried with ease by two men. Over 200 in use in the State of Indiana alone. The only machine with which can be accomplished the facing of blocks by the Borst system. A business proposition to the maker of blocks. An appeal to the common sense judgment of the builder.

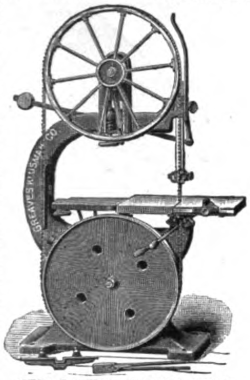
In corresponding with us we make our business your interests.

ASTEROID THE PERMANENT **ROOFING.** SCOTT & CO., 233 E. Front St. CINCINNATI, O. AGENTS WANTED

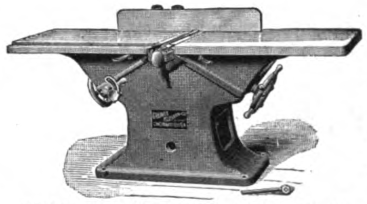
EXPOSITION
OF
Wood Working Machinery
FOR
Carpenters and Builders

Modern in design and construction, with
improved methods of adjustment.
Circulars and descriptive
matter sent upon
request.

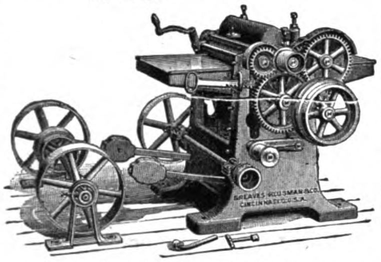
COME AND SEE US!



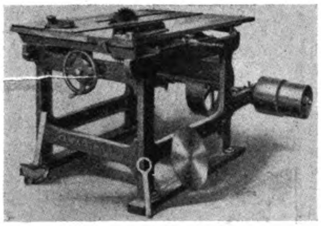
NEW PATENT 96-INCH BAND SAWING MACHINE.
Furnished with rip gauge, roller guards, wood rim wheels, etc. Table can be tilted 45°.



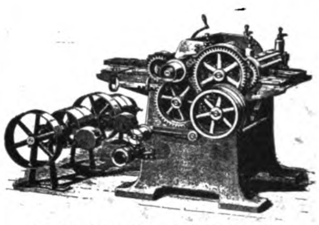
IMPROVED HAND PLANER AND JOINTER,
Tables over 7 feet long and have steel lips.
Cylinder Slotted to receive moulding bits and other irregular knives.
Cylinder has three Bearings, one of which is outside of pulley.



No. 2½ SURFACE PLANING MACHINE.
Planes 24½ inches and any thickness, from 1-16 to 8 inches.



A CARPENTER SHOP IN ITSELF.
CHICAGO No. 2 COMBINATION SAW TABLE.
An excellent machine for ripping, cutting-off, mitering, dadoing, boring, etc.



No. 2½ IMPERIAL 6-ROLL PLANER, MATCHER AND MOULDER.
Cylinder double belted, six large feed rolls. Fast and slow feed. Planes 24¼ inches wide, 8 inches thick, and matches up to 12 inches wide. Weight 3000 lbs.

WRITE FOR PRICES ON REBUILT MACHINERY.

CHICAGO MACHINERY EXCHANGE,
13-15 North Canal Street,
CHICAGO, ILL.

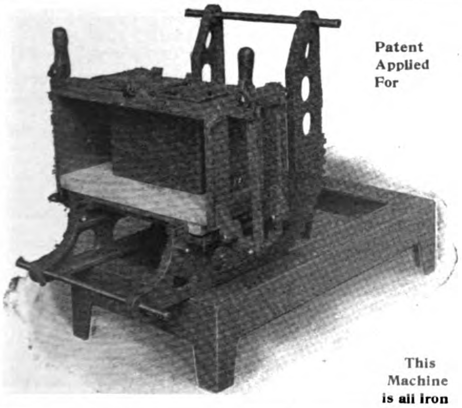
Portable Hollow Concrete Block Machine

BEST—FASTEST—SIMPLEST—CHEAPEST.
MOVE THE MACHINE—NOT THE BLOCKS

Saves labor of off-bearing, avoids loss by crackage or breakage, saves expense of heavy cumbersome iron pallets. Sand, Water and Portland Cement only materials required. BIG PROFITS. Blocks cost 6 cents to make. Sell for 18 cents. Whole outfit costs $125.00.

FULLY GUARANTEED. SENT ON TRIAL.

THE PETTYJOHN CO.,
616 North 6th Street,
TERRE HAUTE, IND.



Patent Applied For

This Machine is all iron

The Perfection Cement Block Machine

Price 50 Dollars

Weight 700 Pounds

Makes the BEST Hollow Cement Blocks of any Machine on the Market. It Tamps on the Face, an Important Fact to Consider when Purchasing a Cement Block Machine.

Just the thing for the Mason, Builder, Contractor or any person with Small Capital desiring to enter into a

PROFITABLE BUSINESS

This Machine has reached the height of Perfection in Simplicity, Durability and Quickness. DON'T DELAY! DON'T HESITATE!

Send for our Descriptive Circular and Prices.

MANUFACTURED BY
ENTERPRISE FOUNDRY COMPANY
Office and Works: 81 OLEAN STREET ROCHESTER, N. Y.

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from
UNIVERSITY OF MICHIGAN

COPPER LIGHTNING RODS

ABSOLUTE PROTECTION from LIGHTNING is given by use of our continuous copper conductors.

E. G. Washburne & Co., 46 Cortlandt St., New York.
Telephone 3125 Cortlandt.

Work put up or material furnished.

THE IMPROVED Hand and Foot Power E. F. B.

SAWING MACHINE.

For Carpenters, Builders and All Wood Workers Who Have Shops Without Power.

SEND FOR CIRCULAR.

THE BARNES TOOL CO., New Haven, Conn.

Diamond Expansion Bolt.

Patented.

For fastening fixtures, timbers, etc., to brick, stone, concrete or other masonry.

DIAMOND EXPANSION BOLT CO.,
9-11-13-15 Murray Street, New York, N. Y

Pay Day

What Does it Mean to YOU?

No matter what your position may be, whether day laborer or office worker, if you are in that discouraged line of men who get the same pittance week after week without prospect of anything better, it is time you appealed to the International Correspondence Schools. For 14 years they have been qualifying dissatisfied workers for better positions and higher salaries.

No matter what your circumstances are, they will qualify YOU for *a better position, a higher salary, and a safe future.* The way is plain, easy, and sure for earnest men. It puts you under no obligation to find out how we can help you. Simply mark and mail the coupon below. *Can you afford to neglect an opportunity for advancement?*

International Correspondence Schools
Box 969, Scranton, Pa.

Please explain, without further obligation on my part, how I can qualify for a larger salary in the position before which I have marked **X**.

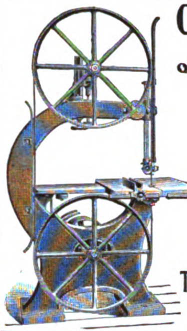
Architect
Architectural Draftsman
Building Inspector
Contractor and Builder
Structural Engineer
Mechanical Engineer
Mechanical Draftsman
Machine Designer
Electrical Engineer
Municipal Engineer
Heat. and Vent. Eng.
Chemist
Sheet-Metal Draftsman

Sanitary Engineer
Foreman Plumber
Electrician
Steam Engineer
Marine Engineer
Surveyor
Textile Expert
Bookkeeper
Stenographer
Ad Writer
French } With Edison Phonograph
German
Spanish

Name ____________________

St. & No. ____________________

City ____________ *State* ____________



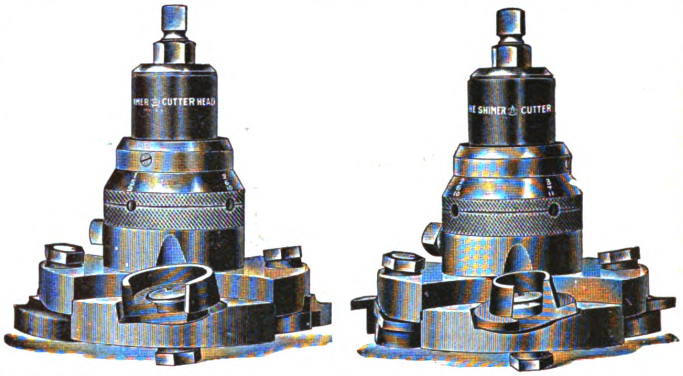
CRESCENT MACHINERY

Quality is all right—so's the price.

Band Saws,
Jointers,
Saw Tables,
Band Saw Blades.

Nothing else.
Catalog tells the rest.

The Crescent Machine Co.,
206 Main St.,
Leetonia, Ohio.



THE SHIMER CUTTER HEAD

For Hard Cross-Grained and Knotty Lumber.

A complete tool with Expansion Device for quickly adjusting the Bits for different thicknesses of tongue and groove edge.

FITTED WITH CIRCULAR BITS

Having a permanent profile and clearance protection, accurate, reliable and low priced. Simple in construction and easy to keep in order. A time and labor saving innovation.

Send for Catalogue containing prices and full particulars.

Address SAMUEL J. SHIMER & SONS, Milton, Pa.

VANDORN IRON WORKS CO
CLEVELAND, OHIO.

STRUCTURAL STEEL & ORNAMENTAL IRON WORK.
JAIL WORK, JOIST HANGERS, IRON FENCINGS.

The Cement Worker's Hand Book

By W. H. BAKER

is compiled to meet the requirements of the workman.

Provides an insight into the mixing and handling of cements, mortars and concretes for building and other purposes.

Pocket Size. 86 Pages.

FIFTY CENTS, POSTPAID

DAVID WILLIAMS COMPANY
14-16 PARK PLACE - NEW YORK

CORDESMAN, MEYER & CO., 26, 28 and 30 Central Avenue,

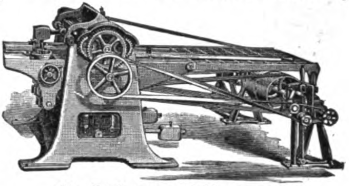
Universal Wood-Worker.

CINCINNATI, OHIO.

Finest Grades of Latest Improved

Wood-Working Machinery

For Planing Mills, Furniture and Chair Factories, Carriage, Wagon and Agricultural Works. Circulars and prices. Correspondence solicited.



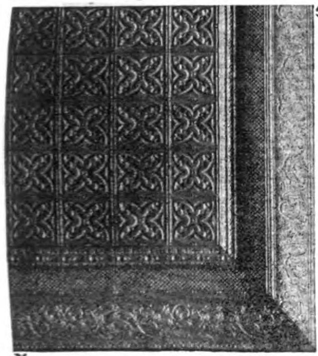
No. 2 Planer and Matcher.

Its application is very simple— no experienced help is needed. With every roll are included nails, tin caps and cement sufficient for the work. **RUBEROID** is so pliable that it fits anywhere.

THE well-told truth has for 13 years drawn builders' attention to **RUBEROID ROOFING**—demonstration of this truth has made its believers legion. **RUBEROID ROOFING** does all claimed for it. It *is* water and weather-proof. Its resistance to acids, gases, great heat and even fire is extraordinary. It will *not* melt, rot or crack. But "above all things" avoid imitations. Look for the registered trade mark "**RUBEROID**" always stamped on the under side. Send for samples.

MANUFACTURED SOLELY BY

THE STANDARD PAINT CO.,
100 William St., New York
CHICAGO OFFICES: 188-90 Madison St.



THE EDWARDS METAL CEILINGS

Each and every plate of superior design and workmanship and resquared after stamping, making them very easy to keep in line when erecting.

Send us plan or sketch giving dimensions of rooms to be covered and we will forward prices and a carefully prepared drawing showing just how the Ceiling will look when finished.

WE ALSO MANUFACTURE

Metal Windows, Metal Shingles, Corrugated Iron and Steel Roofing. Everything in Sheet Metal Building Material illustrated and described in Catalog L, free.

THE EDWARDS MANUFACTURING CO.

"THE SHEET METAL FOLKS."

Main Office and Works,
423-443 Eggleston Ave., Cincinnati, Ohio.

New York
52 Broadway

We make Ceilings for churches, schools, stores, lodge rooms, court rooms, libraries, residences, etc.

Our ceilings are shipped ready for erection. No expert labor required. Working drawings furnished. They're adapted to any kind of building. Exclusive in classified design.

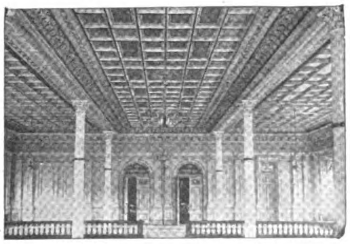
Berger "CLASSIK"

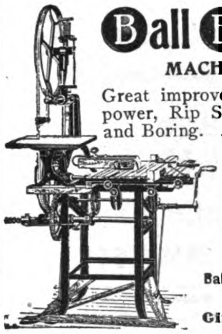
Steel Ceilings

We also make Steel Roofing, Siding, Metal Shingles, Architectural Sheet Metal Work and Fireproofing Material.

Our catalogues sent you free. Ask for them.

THE BERGER MFG. CO.
CANTON, OHIO.
New York. Boston. Phila. St. Louis





Ball Bearing

MACHINERY.

Great improvement for foot power, Rip Saw, Band Saw and Boring. All ready for use, same for power. Other attachments and useful tools.

Manufactured by

PARKS
Ball Bearing Mach. Co.
Sta. A.,
Cincinnati, Ohio

DO YOU WANT THE BEST

DRAWING TABLE

made? If so send for illustrated catalogue and prices.

R. E. KIDDER,
22 Hermon Street, Worcester, Mass.

SECOND-HAND WOOD WORKING MACHINERY

Woods Moulder 12 in.
Berlin Moulder 15 in.
Rogers Moulder 8 in.
Matchers 24 in.
Pony Planers 16, 20, 24 in.

Variety Machines, Double and Single, Jointers, Swing Saws, Rolling Top Saw Tables, Gas and Gasoline Engines, Band Saws, Routers, Sanders, Circular Saws, Jig Saws.

A1 CONDITION. PROMPT DELIVERY.

All Kinds of Machinery Purchased for Cash.

LONG ISLAND MACHINERY CO.
15 Washington Ave., Brooklyn, N. Y.

Use Your Wits

Accept these words of wisdom and use the A. B. C. SCHEDULES, or ITEMIZED BLANK ESTIMATING FORMS to advantage and profit for the use of

CONTRACTORS AND BUILDERS

These Schedules are superior to anything of the kind already offered for sale. Not a text book on estimating, or a series of tables, but just simple, common sense Blank Forms, giving a complete list of all items entering into the construction of a building.

"Let your curiosity be aroused and investigate this."

There is a separate and complete schedule for each of the following trades:—CARPENTERS, MASONS, PLUMBERS, PAINTERS.

A sample copy of the Schedule covering any of these trades for 25c. A complete book (one of each series) ONE DOLLAR.

THE GEM PUBLISHING CO.,
P. O. Box No. 14. BROOKLYN, NEW YORK

"AMERICAN"

Polygon Conductor Pipe

Can be furnished in either Galvanized Iron or Copper.
It is made from galvanized iron in 10-ft. lengths,
without a cross seam; from copper in 8-ft. lengths.

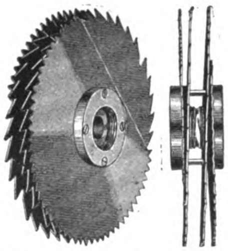
American Rolling Mill Co., MIDDLETOWN, OHIO.

"You Have Restored My Confidence in Patent Lawyers"

THUS wrote an inventor, whom I was serving for the first time, after I had frankly reported that upon careful examination I considered his invention possessed only a few minor points of novelty over prior patented devices, thus saving him false hopes and the cost of applying for a patent. Evidently he had been "plucked," misled, or illy advised by some patent attorney. Send for my booklet, "ABOUT PROTECTING INVENTIONS IN THE UNITED STATES"—it will interest you. Prompt, honest advice and service in patenting inventions, registering trade-marks, and securing copyright protection in the United States and Foreign countries. I have a system by which I can refer you to clients in your State and often in your own city. Ask for references.

Circular on Trade-Mark Registration sent on receipt of request. **GEO. R. HAMLIN,** Patent Attorney, No. 800 H St., N.W. WASHINGTON, D. C

FOX



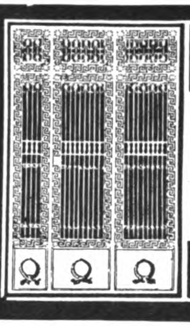
Adjustable Saw Dado Heads
The best thing for cutting grooves.

Fox Foot Power Miter Machines
The best thing for mitering mouldings and similar work.

We also make

Universal Trimmers,
Boring Machines, Lathes,
Planers, etc.

FOX MACHINE CO.
387 N. Front St., Grand Rapids, Mich.



ELEVATOR ENCLOSURES

We are large manufacturers of Elevator cars and Enclosures. Also Bank and Office Grille Work. Window Guards, Ornamental Wire, Iron, Steel and Brass work of every description in any finish. Our workmanship cannot be excelled.

Send for Catalogue.

F. J. MEYERS MFG. CO.
HAMILTON, OHIO, U. S. A.

THE LOVELL WINDOW AND SHUTTER OPERATING DEVICE

For Factories, Foundries, Etc.

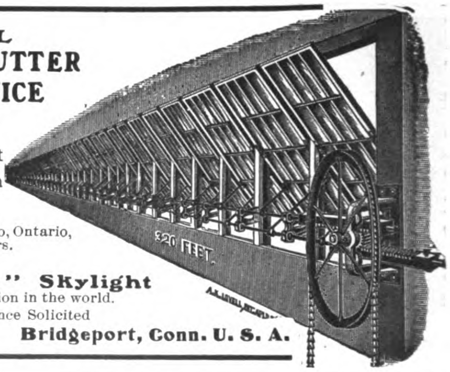
A line of sash 500 feet long can be operated from one station if desired.

THE VOLKES HARDWARE CO., Toronto, Ontario, Sole Canadian Manufacturers.

WE ALSO MAKE

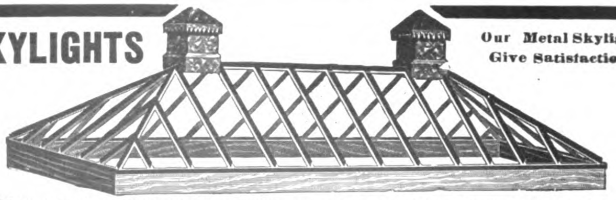
The "Anti-Pluvius" Skylight
Best skylight construction in the world.
Correspondence Solicited

The G. DROUVÉ CO., Bridgeport, Conn. U. S. A.



SKYLIGHTS

Our Metal Skylights Give Satisfaction.



They are so constructed that all condensation is carried to the curb and discharged through weep holes on to the roof without soaking between laps.

The peculiar construction of the curb on our skylights renders counterflashing unnecessary.

Frames of galvanized iron or copper, with glass of any kind or thickness.

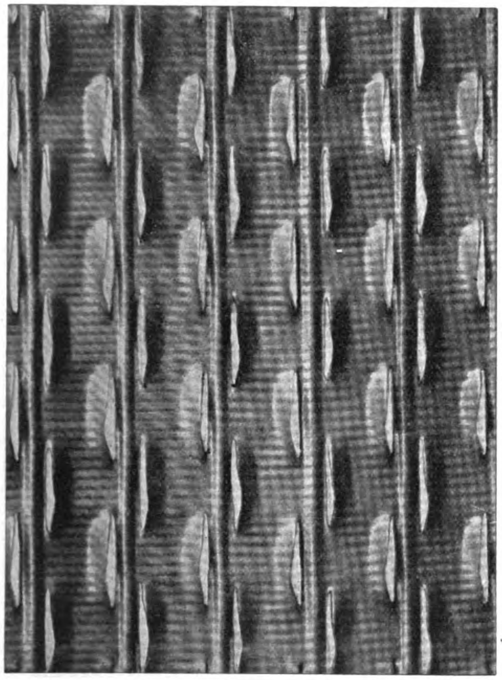
Write for our New Cornice, Skylight and Ornament Catalog.

THE CANTON STEEL ROOFING CO., Canton, Ohio

BOOKS. YOU CAN OBTAIN PROMPT ADVICE regarding the books on any subject in which you are interested by addressing DAVID WILLIAMS COMPANY Publishers and Booksellers, 232 238 William St., N. Y.

CRESCENT STEEL LATH

Saves Money by Reducing Insurance Rates.



CRESCENT STEEL LATH

MANUFACTURED BY

WHEELING CORRUGATING CO.
WHEELING, WEST VIRGINIA.

Walls, Partitions and Ceilings constructed with Metal Lath are Proof against fire, water, vermin and sound.

CRESCENT STEEL LATH

Is made of Steel Sheets beaded every 1¾ inches to give stiffness to the sheet. The openings in the sheet are ample to allow an easy passage to the plaster under pressure, and are guarded by an arch of metal, which prevents the plaster from going through too freely. This lath is coated on both sides with our special anti-rust coating.

Best in Every Respect!

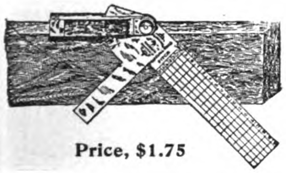
Sample postpaid on request.

We can supply your demands by the car load and ship promptly.

BRANCH OFFICES AND WAREHOUSES:

New York City	47-51 Cliff Street
Chicago	45 and 47 Lake Street
St. Louis	112, 114, 116 South Eighth Street
Philadelphia	402, 404, 406 Race Street
Boston, Mass.	132 and 134 Pearl Street
Chattanooga, Tenn.	King Street

Large Stocks of all our Products are Carried at the Factory and in all the Warehouses.



Price, $1.75

TOPP'S FRAMING TOOL.

A PERFECT TOOL and the only Tool for the purpose ever invented.

Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

Write for booklet. Address the manufacturers,

G. A. TOPP & CO., - Indianapolis, Ind.

Just a Hint On Your Ventilation

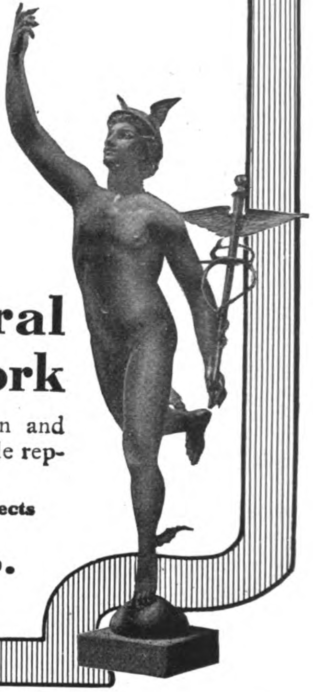
Suppose it's in a large shop—one lot of men want lots of air—another less—then are you going to have one gear operate the entire run—half the men comfortable, the other half mighty uncomfortable. With this simple, inexpensive gear you can operate few or many sash from anywhere at any time, no chains, no dangling ropes.

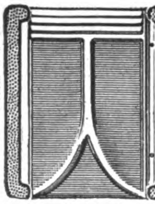
Catalog X-V.

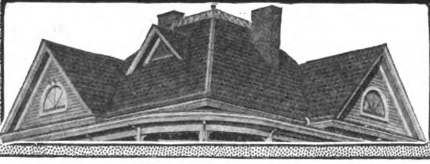
BURNHAM-HITCHINGS-PIERSON CO.
1133 Broadway, cor. 26th St., New York.

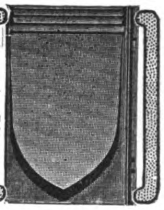
Boston Branch: 819 Tremont Building.

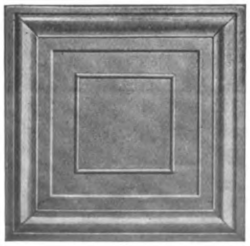
SECURE
PROTECTION AND LONG
SERVICE BY USING OUR
ASPHALT ROOFING
SAVES REPAIRS
SAVES RECOATING
SAVES RENEWING
Send for Samples and Pamphlet
STOWELL MFG. CO.
JERSEY CITY, N.J.



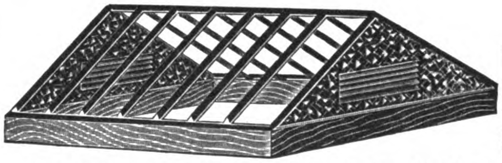









For More Light on the Subject send for our
PHOTO-PAMPHLET
PERFECTED GRANITE ROOFING



Notice Carpenters ! ! !

The second edition of **The Lightning Estimator**, the book that has had such a remarkable sale in the last year, at 50c a copy has been exhausted.

We have ready the third edition greatly improved and one-third larger, which will sell for the low price of 60c (Money order). Simple, rapid, practical, accurate, reliable.

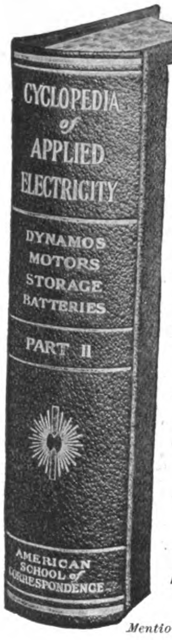
Prepared by a prominent builder.

Based on records of actual construction, not theory.

A $2,000 house estimated in 30 minutes.

Third Edition 60c. Write now.

BRADT PUBLISHING CO.,
JACKSON, MICH. 260 Michigan Ave.



Cyclopedia of Applied Electricity

Five volumes, 2500 pages, size of page 8 x 10 inches. Bound in ¾ Red Morocco. Over 2000 illustrations. We will send the entire

FIVE VOLUMES

FREE

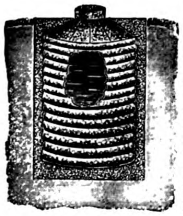
on five days' approval, express prepaid. If satisfactory send $1 down and $2 per month for nine months; otherwise notify us and we will transfer the books free. Cash with order, $18.00. Money refunded if not satisfactory.

Partial List of Contents

Magnetism
Wireless Telegraph
Telautograph
Direct Current Dynamos and Motors Storage Batteries
Electric Lighting
Railways
Management of Dynamos and Motors, Power Stations
Alternating Current Machinery
Power Transmission
Mercury Vapor Converter
Telephony
Automatic Telephone
Wireless Telephony

AMERICAN SCHOOL OF CORRESPONDENCE
Chicago

Mention Carpentry and Buiding



Better Cisterns—Why?

To protect the health of every member of your family. Medical experts have pronounced the brick and wood cistern to be the cause of many cases of sickness.

A Cistern to be perfectly sanitary must be made so tight that no impurities can possibly get through. This can only be accomplished by using the steel cistern.

O. K. Harry Steel Works,
2341 Papin St., St. Louis, Mo

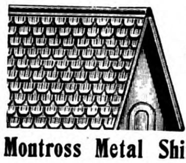
"STAR ENCAUSTIC TILE CO.,"

MANUFACTURERS OF

Superior Unglazed Encaustic Tile

For Floors in Stores, Churches, Depots, Kitchens, Halls, Porches, &c.

Office and Factory, Bluff Street, near Gist,
PITTSBURG, PA.

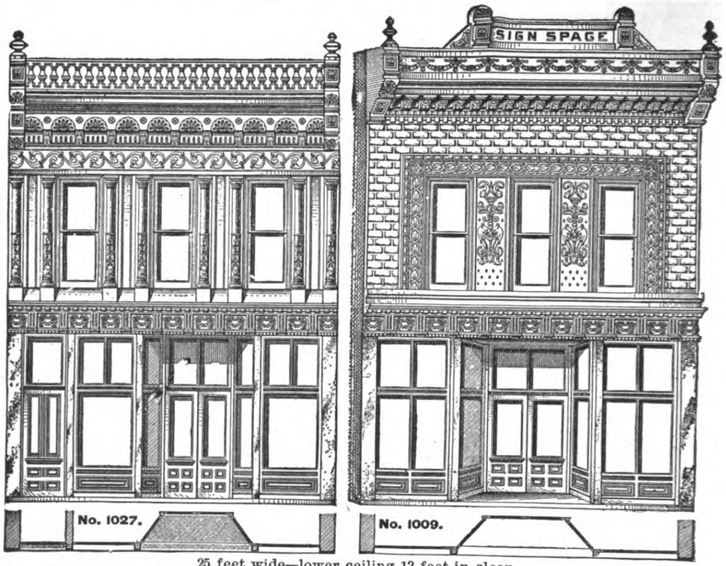


Carpenters

Do you want work laying Montross Metal Shingles? If so—

Write to-day to

Montross Metal Shingle Co., CAMDEN, N. J.



25 feet wide—lower ceiling 12 feet in clear.

Net price F. O. B.	St. Louis, Mo.	$209.00	
" "	New York, N. Y.	238.00	
" "	St. Paul, Minn.	229.00	
" "	Denver, Colo.	268.00	
" "	Dallas, Tex.	253.00	

Net price F. O. B.	St. Louis, Mo.	$187.00
" "	New York, N. Y.	212.00
" "	St. Paul, Minn.	204.00
" "	Denver, Colo.	239.00
" "	Dallas, Tex.	225.00

Galvanized Sheet Steel Fronts

The designs presented herewith illustrate our complete and modern store fronts. The prices include the steel sill course, steel vestibule plate, steel angle columns for covering end walls, steel intermediate box columns; show sash, store doors, transoms, door posts, box window frames with sash of white pine 1¾ in. thick; all glass for same of double strength; galvanized iron work above first-story columns.

We make and ship over 800 fronts annually from 20 to 300 feet in width and from one to five stories high. Having given the manufacture of complete fronts our most careful study for over thirty years, they are now the best, cheapest and most elaborate in the market. Owing to their simple and practical construction, any mechanic, whether experienced in this particular line or not, can erect them, aided by a set of full-size details and instructions that we furnish. We desire to introduce this class of work in every city in the United States, and solicit the correspondence of architects, builders and others contemplating the erection of buildings. Send for references, full descriptive catalogue and discounts.

Established 1846.

MESKER & BROTHER,
421-519 S. SIXTH STREET - - - ST. LOUIS, MO. U. S. A.

THE NEW YORK STEEL CORNER PLATE CO.

—SUPPLY—

The Parker Steel Corner Bead for the Protection of Plastered Corners

Outlines a perfect corner. The best Corner Bead in the market. Fits any ground.

Endorsed by Leading Architects, Builders and Plasterers.

Telephone
876 Madison Square.

All communications
to 1135 B'way, N. Y. C.

LIGHT-HOUSES

On the coasts of the United States are all painted chiefly with OXIDE OF ZINC (75 per cent.). If such paint is the only kind that will stand sea-exposure in all climates, will it not still better stand the milder exposure on an ordinary dwelling? High grade prepared paints are all based largely on OXIDE OF ZINC, which makes them beautiful, durable, economical.

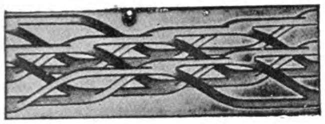
FREE
Our Practical Pamphlets:
"The Paint Question."
"Paints in Architecture."
"Specifications for Architects."
"Paint: Why, How and When."
"French Government Decrees."

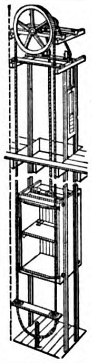
THE NEW JERSEY ZINC CO.,
71 Broadway, - - New York

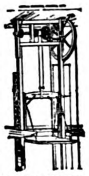
We do not grind zinc in oil. A list of manufacturers of high grade zinc paints will be furnished on application.

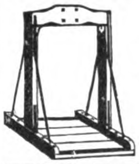
Walters Metal Shingles and Tile
Will last as long as the building they cover.
Rain, Rust and Fire Proof.
Write for catalogue, samples and prices.
National Sheet Metal Roofing Co.,
JERSEY CITY, N. J.

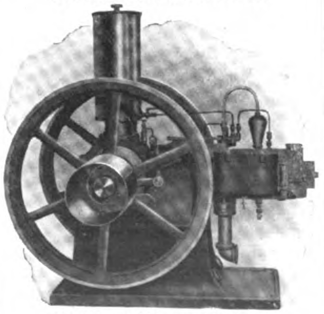
Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google











LOOK OVER THE SIMONDS SAWS, and you will see the points of advantage.

FIRSTLY, they are ground a true taper, which enables the user to run the Saw with very little Set.

SECONDLY, each Simonds Saw is handled by a mechanic who thoroughly understands the hanging of the Saw, which guarantees this most important feature.

THIRDLY, the filing and setting of the Simonds Saws are carefully done, and thoroughly inspected, so that the Saws, on leaving the factory, are ready for work.

FOURTHLY, the steel used in the manufacture of the Simonds Saws is a high carbon crucible steel, and will hold its cutting edge much longer than the ordinary steel generally used.

FIFTHLY, each Saw is put up in a separate case, thus avoiding fingering and rust marks commonly found on Saws that are not encased properly.

SIXTHLY, because every Simonds Saw is guaranteed thoroughly.

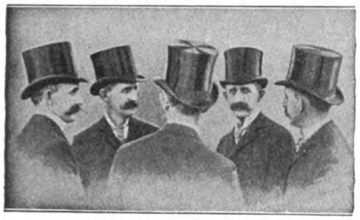
Any mechanic trying a Simonds Saw, and not finding same satisfactory, may return the Saw, either to the dealer or to the Simonds Mfg Co., and get either a new Saw or money paid back.

SEND FOR CATALOGUE AND PRICE LIST.

SIMONDS MFG. CO.,

Fitchburg, Mass — Chicago, Ill. — New York, N.Y
Portland, Ore. — Seattle, Wash.
SIMONDS MFG. CO., Ltd., New Orleans, La.
SIMONDS SAW CO., San Francisco, Cal.

STANDARD MINERAL WOOL



LOOKING ALL WAYS FOR BUSINESS

COLUMBIA MINERAL WOOL CO.,
Room 918, 112 Clark St. CHICAGO.
Samples and Circulars Free

Fireplace Mantels
MADE OF
Ornamental Brick
$12 and up.

Last longest—look best—are not too costly. There's no other kind so good—so pleasing. Our Sketch Book tells all about them. Write for it.

PHILA. & BOSTON FACE BRICK CO. - P. O. Box 8613 - BOSTON, MASS.

OUR FINE HARDWOOD FLOORING
SHOULD BE THE BEST.

We have been making PARQUETRY for TWENTY YEARS. We have our own saw mill and timber tracts and two factories. Send for our trade discounts and our Design Book No. 5.

WOOD-MOSAIC FLOORING CO.
ROCHESTER, N. Y. — NEW ALBANY, IND.

THE LEADING WORK ON MODERN BUILDING CONSTRUCTION IS

Kidder's Building Construction and Superintendence.

Vol. I., Masons' Work. - $4.00.
Vol. II., Carpenters' Work, $4.00.

Treats all operations in detail, describing and illustrating how the parts of buildings should be put together.

SOLD SEPARATELY BY

DAVID WILLIAMS COMPANY,
14-16 Park Place. - - NEW YORK

A HOUSE
Lined with
Mineral Wool

As shown in these sections, is warm in winter, cool in summer, and is thoroughly deafened. The lining is vermin proof; neither rats, mice nor insects can make their way through or live in it. Mineral Wool checks the spread of fire and keeps out dampness.

Sample and Circular Free.

U. S. MINERAL WOOL CO.,
143 Liberty St., New York.

The Boynton Furnace Co.
SOLE MFRS. OF
Boynton's Furnaces,
Ranges,
Hot Water Heaters,
Steam Heaters, Etc.

207-9 Water Street, New York.
147-9 Lake Street, Chicago.

Bolcoa
TRADE MARK
ETCHING FLUID

Will mark your tools in a manner impossible to erase, without destroying the article itself. Protect yourself against loss and theft. Easy of application. **Price 25 cents.** We handle a full line of tools. Let us know your wants.

Reed & Auerbacher Co.
229 Bowery, N. Y.

NEW SELF-SETTING PLANE
Sample sent as per circular if not kept by dealers.
GAGE TOOL CO., Vineland, N. J.

Irons warranted; Plane is returned money refunded.

MILLER'S HAND MORTISER.
For Mortise Locks. Time Per Door. Three Minutes.

Sold on Trial for $12.00.
$4.00 with order, balance in thirty days.
ALBERT W. MILLER MFG. CO.,
Cincinnati, Ohio, and Riverside, Calif.

CARPENTRY AND BUILDING

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

MARCH, 1906.

A Remarkable Building Movement.

The great activity which the country witnessed the past year in the building industry naturally lends interest to any forecast of future operations and incidentally to the amount of structural steel that will probably be required, as from it some idea may be gained of the volume of work in prospect. It has recently been computed that for buildings to be erected the coming season in New York there will be required 200,000 tons of steel, this amount representing projects on which contractors' bids have been asked and which are expected to be carried out unless interrupted by financial or industrial developments calculated to check all business. It is entirely reasonable, in view of these figures, to look for the placing of 300,000 tons of structural steel for work in New York alone before the end of the year. The total placed in the year 1905 for use in New York City has been closely calculated and is found to be somewhat above 200,000 tons. A half million tons of structural steel sold in two years for new buildings in the metropolis alone is so strikingly in line with what the bolder prophets have been saying of the future of steel as to arrest attention. It recalls the phase of the subject that elicited special comment in a meeting of steel manufacturers in a New York office building. Industrial conditions at the time were not as promising as now, but there were optimists in the group, and one of these expressed strong faith in the continued expansion of steel consumption. Calling attention to the hundreds of low and antiquated buildings in lower New York visible from the meeting room, he averred that the tearing down and rebuilding in Manhattan alone in the succeeding 20 years would mean the consumption of an enormous tonnage of metal, and, when taken in connection with like operations throughout the country, warranted the brightest expectations for the future.

While the amount of structural steel to be required in New York this year is remarkable, representing in part perhaps the accumulated projects of recent years in which strikes have upset all calculations in the building trades, recent reports from other cities, notably New Orleans, Chicago, San Francisco, Pittsburgh and Cleveland, indicate that 1906 will be a year of great activity, in most cases exceeding the great record of 1905. In New Orleans, for example, 25,000 tons will be required for the carrying out of plans now well along. What this amount of steel represents is indicated in part by the statement that the rebuilding movement in Baltimore, in replacement of the more prominent of the buildings consumed in the fire of 1904, has only taken so far about 30,000 tons of steel. What the 300,000 tons will mean that is likely to be ordered for new construction in New York this year can be comprehended in part by one who has traveled about New York in recent months and noted how streets are broken in upon by building operations that can literally be counted by hundreds.

The Modern Apprentice System.

The imperative necessity of renewing the apprentice system on a general and comprehensive scale has become apparent to every employer who is dependent on skilled mechanics for his working force. In order to meet the enormously increased demand for high-class workmen a general return to the apprentice system seems to be the best solution of the problem. Young men of the best available class, who shall bind themselves to remain with their employers until the end of an agreed term, are given a complete period of training, and where specialists are required in the establishment they must be educated to become more than ordinary journeymen. Many employers in the leading cities of the country have established an apprentice system to make competent workmen, but there appears to be a variance of opinion as to which is the better method of safeguarding the employer against the desertion of the apprentice before the expiration of his contract term. One system is to require a cash deposit of from $50 to $100, which shall be forfeited by the apprentice if he breaks his contract, but the money is returned to him, plus interest, and oftentimes with a cash bonus upon the expiration of his time. The other idea is to ask no forfeit but to offer a bonus at the expiration of the term. The general opinion of employers who have had much experience with apprentices is that the forfeit has proved much the better way, especially when coupled with a bonus, as they are apt to be tempted by journeymen's wages if there is nothing to hold them, although they are paid very well during their apprenticeship considering that they are students.

Employer Pays School Fees.

American employers may find useful suggestions in a report just issued by the Board of Education, South Kensington, London, in which instances are cited in the hope of stimulating co-operation between employers of labor and the managers of technical institutions and evening schools. The most common and simplest form of co-operation touched upon in the report is where the employer pays the technical institute or evening school the fees of those employees who take courses approved by the employer as suited to the circumstances of the special industry concerned, a report as to attendance and progress being generally required. In some cases the necessary books are provided partly or entirely at the employer's expense. When students have passed successfully through a course of study approved by the employer, in certain cases they become entitled to an increase of wages, while in several instances the usual annual increase in the rate of wages of an apprentice is made dependent upon regularity of attendance at approved evening classes or on passing certain examinations. Concession in working hours is another form of encouragement. There are numerous examples of students attending evening classes being allowed without loss of pay some reduction in the ordinary hours of work, some firms permitting employees to leave the works on two or three days a week at an hour which enables them to attend evening classes with some degree of comfort as regards obtaining meals and changing working clothes. Some large concerns hold attendance of students at course or classes during the ordinary working hours as a definite portion of their em-

ployment, counting on wage earning or apprentice time terms varying from a minimum of two hours a week to as much as six months a year. When the concession is small the number permitted to profit by it is large and *vice versa*. Thus while an arrangement which sets free for instruction one afternoon a week may prove applicable to a large proportion of the better apprentices with the firm adopting it, only a few even of the best can be expected to give evidence of sufficient promise to justify their being set free for six months' continuous study in a technical school. Still another form of remission is "writing off" a part of the apprenticeship course, thus possibly reducing the apprenticeship of a good student by a year.

Quality of Instruction Imparted.

A few of the larger of the American electrical companies have adopted systems which include instruction beyond the practical side of shop work. But the tendency has been toward the other extreme, the trouble being that in many establishments the apprentice receives altogether too little instruction even in the trade which he has bound himself to learn. The young men are left entirely to the shop foreman, who may not take an interest in this portion of his duties and who may not possess the faculty of imparting his knowledge to his pupils. Consequently it is not at all strange that some shops produce much better mechanics than others. The boy with less instruction and thorough training cannot be expected to turn out to be the same high-class journeyman as the apprentice of another shop who receives careful instruction in all branches of his trade. The real fault is in the office as a general thing. If the managing officers insist that the apprentices be given full measure of training, then there will result a constant accession of the best mechanics thoroughly familiar with the system and product of the works in which they were trained. Some of these will go elsewhere, but more will remain, especially in the sort of shop that fosters its apprentice system. As to educating apprentices after the custom of British employers, as set forth in the report of the South Kensington Board of Education, probably few American shops will go so far at this time, except where highly trained specialists are required in a class between the skilled mechanic and the educated engineer. Yet by giving personal attention to the apprentice system employers can usually find means at hand for securing useful courses of study for the boys without taking away from their earning capacity. In practically every place of any size ample opportunity is provided free of cost for those young men who are ambitious to extend their education. Some of the technical schools have evening courses usually under the auspices of some association, and various cities have mechanics' associations or other local organizations which have the training of young men as an essential reason for existing. Apprentices may be encouraged to avail themselves of such opportunities, and though in some instances young men may be attracted from the shop to other work, yet on the whole the employer should be the material gainer by such an extension of the apprentice course of training.

Building and Prices in 1905.

It will be recalled that in our issue for May last year we referred editorially to the building situation as it then existed and to the amount of building which the country was likely to witness in 1905, basing the calculations upon the value of the improvements for which permits had already been issued. In that connection we cited figures presented by Bradstreet's *Journal*, which had received reports from 155 cities and towns, nearly all of them tending to show that an aggregate of something like $600,000,000 would be expended in the country in that year in building operations. Now that the work has been done and an approximate grand total is obtainable, the same authority has found that the amount actually expended or provided for last year in 165 cities from which reports have thus far been received was actually $711,123,741, as against $505,703,921 expended in 1904. There is thus indicated a gain of 40.6 per cent. in 1905 as compared with the year before. In this connection it is interesting to show by groups of cities in the two years named the value of the building improvements:

	No. towns.	1905.	1904.	Increase. Per cent.
New England	15	$14,264,232	$11,194,405	27.4
Middle	16	349,723,254	236,362,979	47.9
Western	48	188,773,916	132,025,060	42.9
Northwestern	22	47,546,788	36,954,307	28.7
Southern	58	60,373,268	45,385,681	31.0
Far Western	6	50,442,283	43,781,489	15.2
Totals	165	$711,123,741	$505,703,921	40.6
Greater New York	..	260,605,229	158,568,540	64.3
Canada	16	39,243,116	28,925,491	35.6

There is very general agreement that another active year is likely in the building trade. Barring unexpected labor or financial troubles, the feeling very generally is that 1906 will equal or exceed 1905. Illustrative of this are the replies from 159 cities, of which 102 report a probable increase in the amount expended, while 35 report that fully as much will be constructed, and only 25 report a decrease likely.

Building material is higher than ever before, apparently keeping pace with the increase in the amount of building. *Bradstreet's* has this to say about the relation of the two: "The increased cost of material and labor is cited by some observers as a basis for a belief in a decrease in building. Some others have also called attention to the danger of speculative overbuilding. Against this, however, are cited the large numbers of plans and specifications coming in, and the fact that building material prices are strong at the highest prices on record. Just what has occurred in the way of advances in building material may be gathered from the following table, taken from *Bradstreet's* monthly compilation of prices of leading staples:

	July 1, 1896.	Jan. 1, 1905.	Jan. 1, 1906.
Brick, Hudson River, hard, per M	$5.25	$7.25	$10.25
Lime, Eastern common, per barrel	.70	.80	.92
Nails, wire, from store, base price per keg	2.80	2.00	2.15
Glass, window, 10 x 15, per box, 50 square feet	1.55	2.04	1.72
Pine, yellow, yard schedule, per M	17.00	21.00	26.00
Timber, Eastern spruce, wide random, per M	15.00	20.50	27.00
Timber, hemlock, Pennsylvania, random, per M	11.00	17.00	21.00

Brick, it will be seen, are nearly double in price that paid in 1896 and $3 per 1000 higher than on January 1 a year ago; all kinds of lumber are higher and window glass alone is lower.

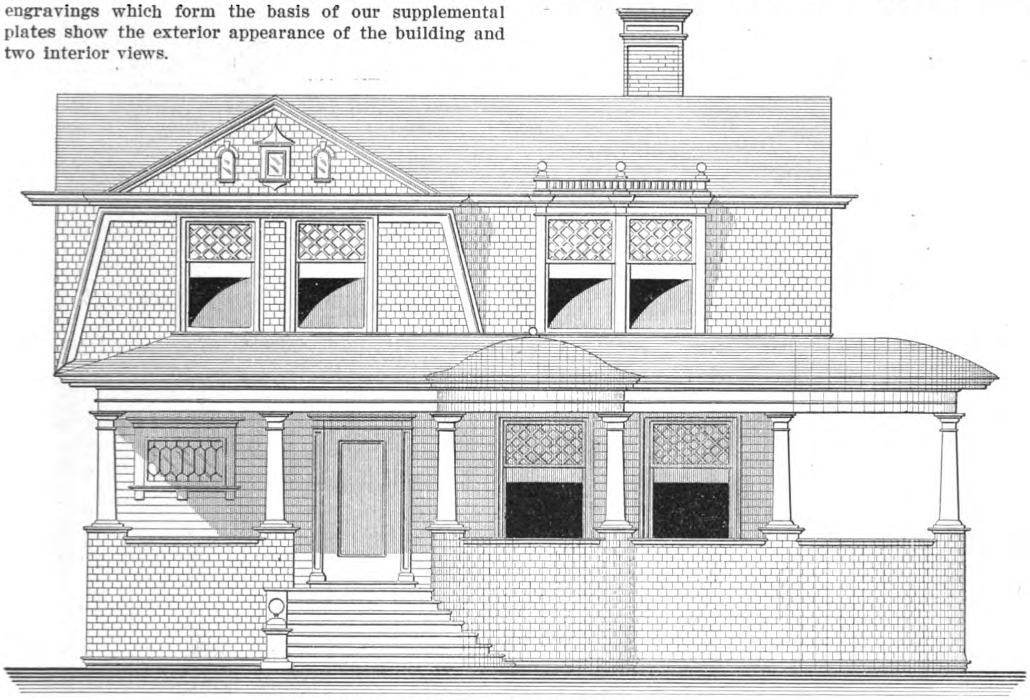
Architect of Pelham Schoolhouse.

In presenting an account of the warming and ventilating of a schoolhouse at Pelham, N. Y., in our issue for February, we inadvertently omitted the name of the architect. We take this occasion to state that the drawings were prepared by A. G. C. Fletcher, with offices at 1133 Broadway, New York City.

A NEW TESTING LABORATORY, which has just been completed in Chicago and which we understand will be supported by the large fire insurance companies, is claimed to be a model of fire proof construction. The walls are vitrified brick, the cast iron columns supporting the steel girders for the floors and roof are protected by hollow tile; the floors, roof and partition are of semiporous hollow terra cotta with thick walls, and all the openings are framed in rolled steel. Thirteen different makes of fire proof window frames and sash have been used, all of them in sheet metal. All the doors are of filled copper or steel, and large sections of hollow terra cotta form the steps and landings.

A DUTCH-COLONIAL FRAME DWELLING.

THE example of Dutch-Colonial architecture which we illustrate herewith is a ten-room dwelling erected a short time since in Washington, and which embodies in its arrangement features likely to appeal to many of those who are thinking of building a home of their own. As the dwelling is located in what might be termed the heart of the shingle district it is natural to find this form of covering extensively used in the external treatment, and with what success may readily be gathered from an inspection of the elevations. A noticeable feature, and one which many will appreciate, is the 8-foot veranda extending along the front and east side of the house with a neat pagoda just at the right of the front steps. The veranda is lighted by three ceiling lights controlled by a switch in the vestibule. The half-tone engravings which form the basis of our supplemental plates show the exterior appearance of the building and two interior views.



Front Elevation.—Scale, ⅛ Inch to the Foot.

A Dutch-Colonial Frame Dwelling.—Edwin A. Williams, Architect, Seattle, Wash.

A study of the plans shows upon the main floor a reception hall of generous dimensions with hat and coat recess, lavatory, etc., a large living room with open fireplace and seats on either side, a dining room with beamed ceiling casement windows with wide sill, a triple window at the further end of the room five feet from the floor to accommodate a buffet and a kitchen fitted with the usual conveniences in the way of pantries, closets, shelving, sink, &c.

According to the specifications of the architect the foundation walls are of concrete 9 inches thick, on which is bedded a 3 x 8 inch plate supporting 6 x 6 inch posts, on which in turn rest 6 x 8 inch girders halved at the corners. On the girders are 2 x 10 inch joists laid 16 inches on centers and braced with a row of 2 x 4 inch herring-bone bridging. On the joists is placed a ⅞ x 8 inch ship-lap floor and on this a 2 x 4 inch plate to receive the studding. The latter is 2 x 4 inches placed 16 inches on centers. The second story joists are 2 x 10 inches, the ceiling joists 2 x 8 inches and the rafters 2 x 6 inches. The rafters of the roof and gables are covered with 1 x 6 inch rough boarding laid in courses and set 2 inches apart, this in turn being covered with cedar shingles exposed 4½ inches to the weather.

The entire frame of the building from the ground to the main cornice is covered with ⅞ x 8 inch shiplap put on horizontally and securely nailed. Over this is placed 3-ply P. & B. building paper, which in turn is covered for the first story with 4-inch cedar siding laid 3 inches to the weather. The bases of the veranda and gables are covered with shingles, as shown. The veranda joists are 2 x 8 inches, placed 20 inches on centers, and the ceiling joists are 2 x 4 inches. The floors are ⅞ x 4 inch material, securely nailed to the joist and put together with white lead.

All walls are lathed and plastered with two-coat work, finished with a third coat of plaster of Paris. The finish floors in the first and second stories are of first quality dry vertical grain flooring. The living room has a paneled seat on either side of the fireplace. The kitchen is wainscoted 3 feet 6 inches high, and the bathroom 5 feet high, with Alpine plaster blocked off to represent tile. The pantries are wainscoted 4 feet 6 inches high.

The reception hall and living room are stained to represent Old English oak, the dining room weathered oak, while the sleeping rooms and halls upstairs are finished in the natural wood. The kitchen and bathroom are in white enamel. In finishing, the woodwork was treated to one coat of filler, two coats of the desired stain, followed by a coat of Dead-lac. The house is piped for gas and wired for electric bells and lighting, the positions of the various switches being indicated on the floor plans. There are two electric bells in the kitchen, one for the front door and one for the rear door. All exterior work has three coats of Sherwin & Williams paint, while the shingles were treated to two coats of Cabot's shingle stain.

Some of the leading items of cost, as furnished by the architect, are: 43 cubic yards of concrete, $258; lathing and plastering, $253.20; inside finish, $876.40; painting, $300; electric work, $140; plumbing, $300; mantel, $75; heating, including furnace, $300; tinwork, $30; rough lumber for roof and frame of building, ship-lap and shingles, $800; mason work, including flue lining of chimney, $50; finishing hardware, $75.

The dwelling here shown was erected in Ellensburg,

Wash., for Mrs. Agnes H. Gray, in accordance with plans prepared by Edwin A. Williams, 514 Marion Block, Seattle, Wash. The contractor was Will A. Ames of Ellensburg.

Doorways of New York Houses.

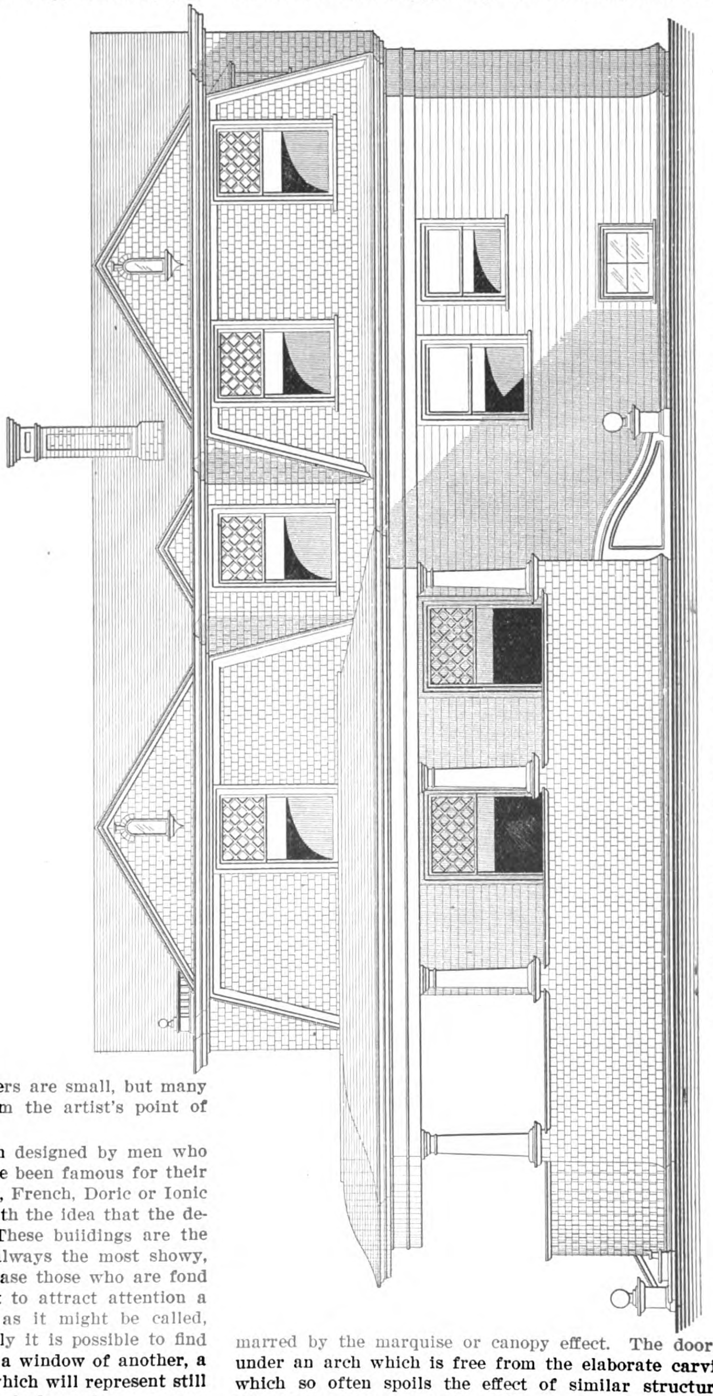
It would almost seem that doorways of quaint yet artistic design were something of a fad by those who can afford to build houses in New York City, and many profess to be able to tell the tastes of the owner of the dwelling by the display that is made on the door. The fad for doorways, if such it may be called, has grown to such an extent that often when an old house has been purchased the owner has it remodeled. Particular attention is paid to the door, which must be made as elaborate as possible, regardless of the fact that it will not be at all in keeping with the rest of the structure. Doorways are to be seen everywhere which have in their composition a little of everything, and consequently represent nothing. One piece is borrowed from the French school, another from the Italian, a few Doric columns are thrown in and sometimes there is a suggestion of the Egyptian and Roman periods.

A few years ago the houses of the city were plain and substantial. The brownstone front predominated and the entrances were in keeping with the structures themselves. In recent years, however, a change has come over the city. Men of means have been erecting costly palaces till the chief thoroughfares near Central and Riverside parks are studded with houses which have cost fabulous sums to build. These modern palaces are sometimes gaudy affairs built by men of wealth who have little idea of what is artistic. Others are very different. A stroll along Fifth avenue, particularly in that part facing Central Park, will show houses of all sorts and sizes. Some are large and occupy almost the entire space from one street to another. Others are small, but many of the small ones are gems from the artist's point of view.

Some of the houses have been designed by men who admire certain periods which have been famous for their buildings. Some are pure Italian, French, Doric or Ionic from roof to cellar, in keeping with the idea that the designer has tried to carry out. These buildings are the most artistic, but they are not always the most showy, and consequently they do not please those who are fond of display. For those who want to attract attention a composite style of architecture, as it might be called, has become popular. Consequently it is possible to find a house with a door of one style, a window of another, a balcony of still another, tracery which will represent still another period and the result is a hodge-podge.

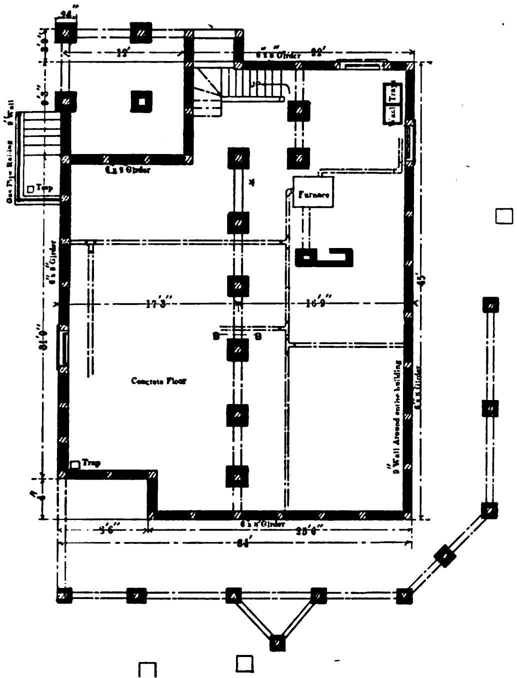
The fad nowadays is for a so-called modern French school design. The Italian palaces and French châteaus furnish the most ideas for the successful architect. It is to the entrances to these fine houses that the designers seem to pay most attention. Some are very elaborate and handsome. In most of them the French fad is very prominent, says a contemporary.

One of the most artistic doorways in the city is at Col. John Jacob Astor's house, 840 Fifth avenue. The building is modeled after the Italian school of the period of Francis I. The treatment is refined and simple and the detail good. The door is in thorough keeping with the rest of the building, though the effect has been rather marred by the marquise or canopy effect. The door is under an arch which is free from the elaborate carving which so often spoils the effect of similar structures. The windows on each side of the door are under similar arches. A carriageway leads to the door and a neat wrought iron railing along the stoop line separates this from the sidewalk. At each end of the railing stands a dainty lamp post. The doors are of wrought iron.

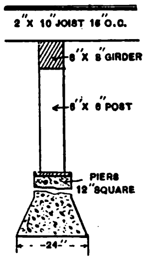


A Dutch-Colonial Frame Dwelling.—Side (Right) Elevation.—Scale, 1/8 Inch to the Foot.

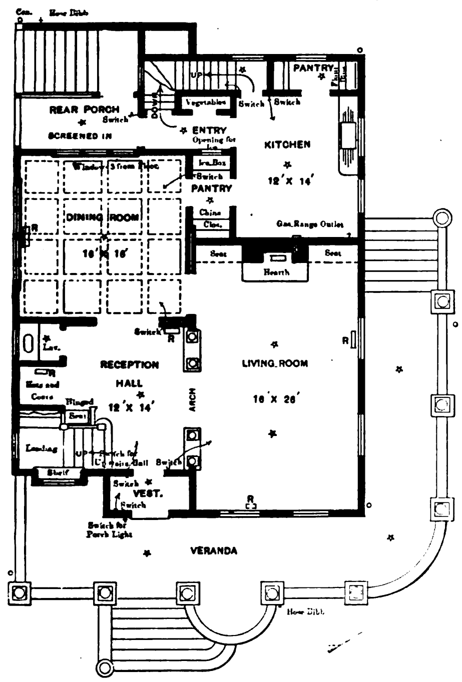
A little further up Fifth avenue, at 871, is the house built by the late William C. Whitney. This is plain and very severe in style. A balcony supported by eight columns marks the entrance. The four inner columns are of marble and the cornices and pedestals are plain. There is no attempt at decoration. The doors are wrought iron, simple in design and artistic in effect.



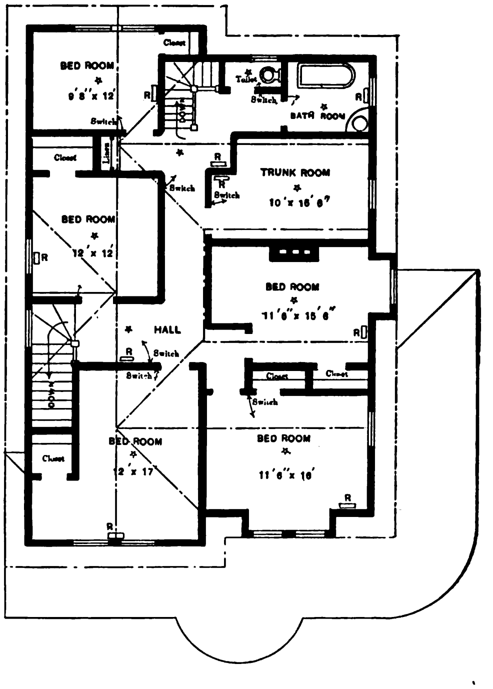
Foundation.



Construction in Cellar on Line B B of the Foundation Plan.—Scale, ¼ Inch to the Foot.



First Floor.



Second Floor.

A Dutch-Colonial Frame Dwelling.—Floor Plans.—Scale, 1-16 *Inch to the Foot.*

A fair sample of the modern school is seen in the doorway of the house of Philip Lewisohn at 923 Fifth avenue. This is a comparatively narrow house. The decorations are very elaborate. The whole of the ground floor is taken up by the entrance. Six Doric columns support a cornice treated in the style of the Italian Renaissance. The doors are of wrought iron, rather elaborate in design, and the windows on each side are treated in the same way. An iron balustrade guards each side of the steps leading from the street, and at the bottom step are two electroliers on which are opaque globes.

Further up Fifth avenue, at the corner of Ninety-first street, stands the new home of Andrew Carnegie. The entrance is on the south side and is quite small for the size of the building. A carriage drive leads to the door, and the way is marked by heavy iron railings. The building itself is another illustration of the modern French school. The lower part is built of stone and the doorway is through heavy stone walls. A square stone pillar stands at the end of the railing, and the entrance is through an arch. The door is wrought iron and elaborate in design. The marquise, which is of iron and opalescent glass, is canopy shape, and over this is a heavy stone balcony.

"Versailles stoned to death," was the criticism of an authority when he first viewed the façade of the building.

Senator W. A. Clark's house at Seventy-seventh street and Fifth avenue is also an adaptation from the French. The entrance to the art gallery has been called "Clark's Arc de Triomphe." It is unlike anything else in the city. The idea was to give an arch effect, and while architecturally it may not be attractive it is a good piece of engineering to secure the heavy pieces of stone securely,

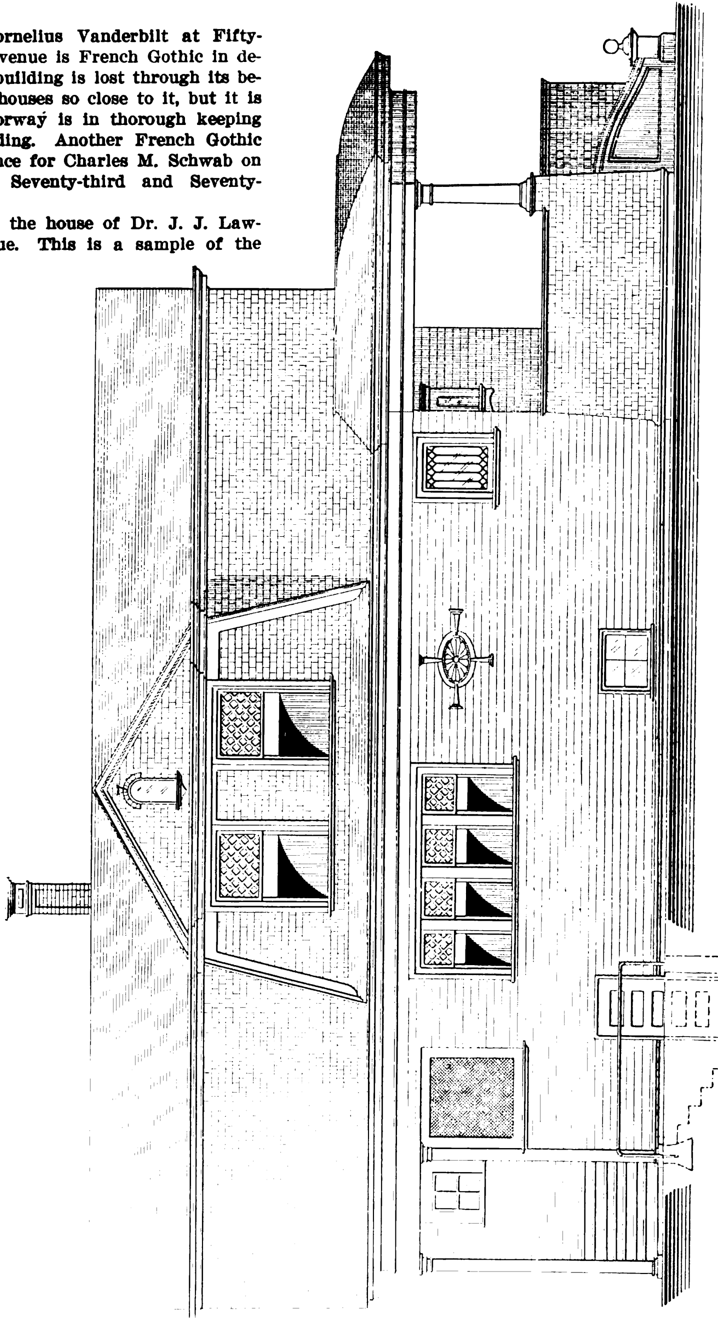
and some elaborate iron work must have been used, as the stones do not support themselves.

One of the finest specimens of architecture in the city, as seen in a private dwelling, is the house of William K. Vanderbilt at Fifth avenue and Fifty-first street. This building was designed by Richard Hunt and is said to be the finest example in this country of a building of the period of Francis I. It is one of the show buildings of the city.

The house of Mrs. Cornelius Vanderbilt at Fifty-seventh street and Fifth avenue is French Gothic in design. The beauty of this building is lost through its being crowded by the other houses so close to it, but it is well designed and the doorway is in thorough keeping with the rest of the building. Another French Gothic building is the new residence for Charles M. Schwab on Riverside Drive between Seventy-third and Seventy-fourth streets.

A classic in its way is the house of Dr. J. J. Lawrence at 1080 Fifth avenue. This is a sample of the Italian Renaissance. Four columns with Scamozzi caps support a balcony, under which is the entrance. The door is of wrought iron and on each side of the columns is a square window, over which is a circular opening, treated in the same way as the door. The whole effect is simple and graceful and the balcony is much more imopsing than the French marquise, which mars so many of the entrances to houses.

Another attractive doorway is on the house of I. V. Brokaw at 1 East Seventy-seventh street. This is Romanesque in design. A balcony is supported by six twisted columns and a stone balustrade stands to guard the edges of the steps. The beauty of this design is rather spoiled because the building is covered with a creeper.



A Dutch-Colonial Frame Dwelling.—**Side (Left or West) Elevation.**—*Scale, ⅛ Inch to the Foot.*

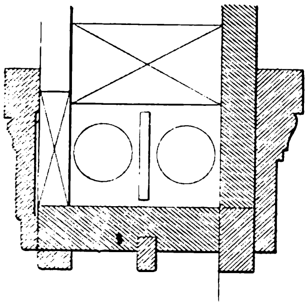
Suburban House Lighting.

The lighting of buildings outside of the limited area covered by municipal plants has long been a problem to owners, and there are yet many people at sea upon the subject, although the various methods are resting practically on their merits rather than on the virtues which promoters picture them to have. Every known scheme is represented by a few examples at least, but to-day those not having strong features of merit are, generally speaking, limited to interested persons and their personal friends.

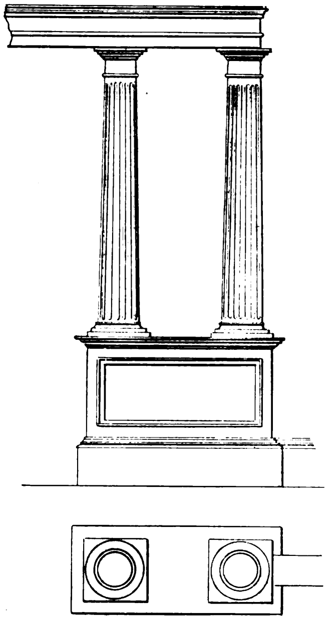
Electric lighting in isolated houses is too expensive for any but the very wealthy, who are as much averse to standing unnecessary outlay as their less fortunate fellow men, says a writer in an exchange.

Municipal plants on a small scale are too complicated and expensive except for any but community interests of sufficient strength to pay the usual fixed expense of attendants in addition to cost of installation, fuel, raw product, &c.

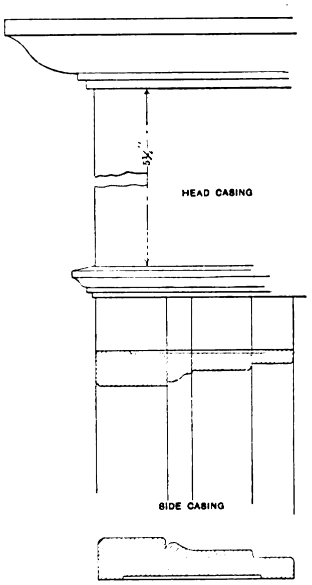
Of the various means not prohibitive by reason of cost, maintenance or other causes, by which individual houses may be lighted, carbureted air supplied by the best forms of gasoline gas machines has, from results, been gradually accorded first place. These are cheaper—cheaper to install, cheaper to maintain, more reliable and more uniformly satisfactory in every respect than most people are aware of. Gasoline machines are suitable for every variety of building. The material used in installation is all ordinary and but little time and no skill is necessary to operate them. In any case where the gasoline apparatus has not given the service it should the trouble is traceable to the owner's failure to place his work in the hands of one conversant with the chemistry



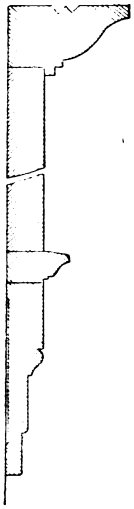
Horizontal Section through Window Frame. —Scale, 3 Inches to the Foot.



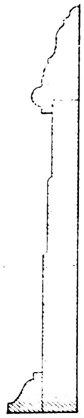
Details of Reception Hall Arch.—Scale, ⅜ Inch to the Foot.



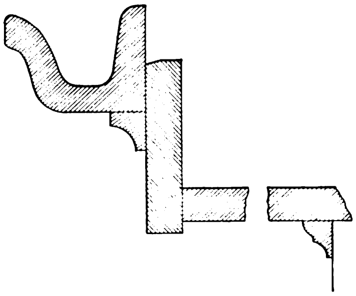
Details of Inside Finish.—Scale, 3 Inches to the Foot.



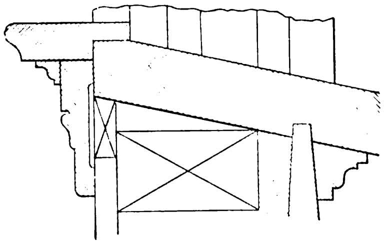
Section of Cap and Head Casing.—Scale, 3 Inches to the Foot.



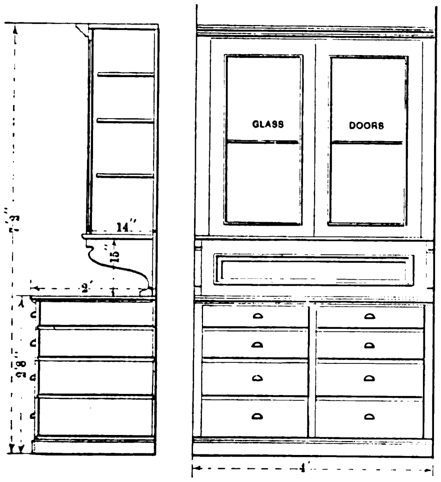
Base in Principal Rooms and Hall. —Scale, 3 Inches to the Foot.



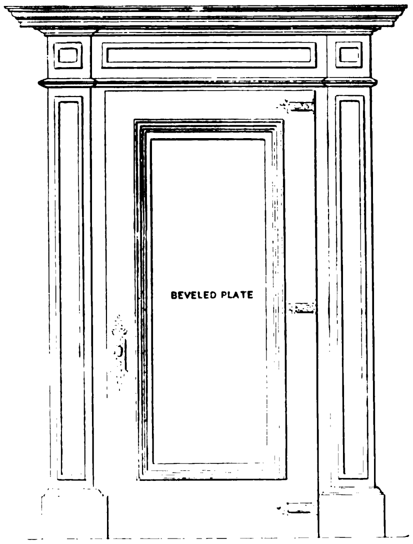
Section of Main and Porch Cornices. —Scale, 3 Inches to the Foot.



Vertical Section through Window Sill and Stool.—Scale, 3 Inches to the Foot.



Section and Front Elevation of China Closet.—Scale, ⅜ Inch to the Foot.



Elevation of Front Entrance Door.—Scale, ⅜ Inch to the Foot.

Miscellaneous Constructive Details of Dutch-Colonial Frame Dwelling.

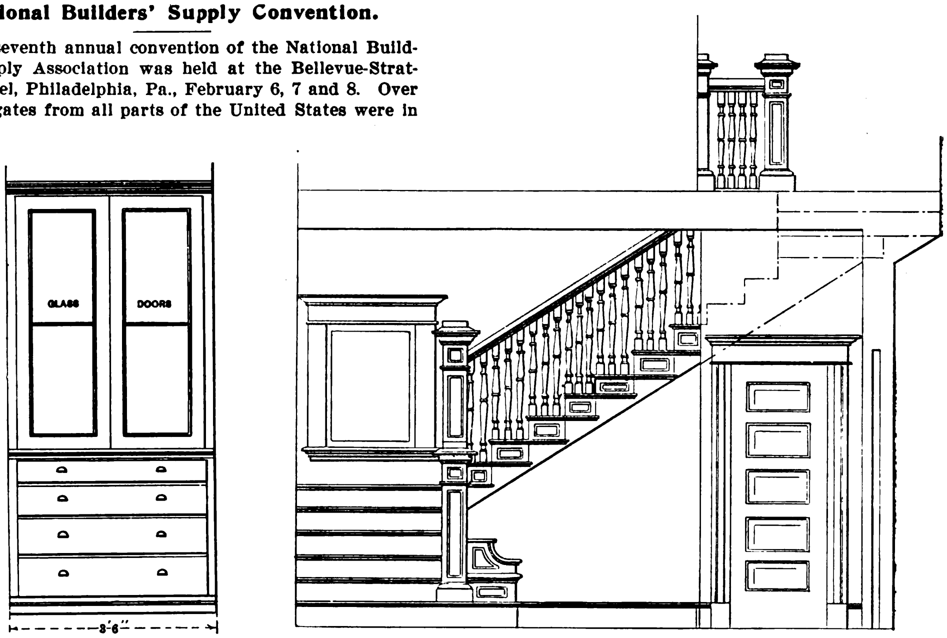
of air and gasoline and their combinations. No one can design or erect an apparatus to handle a specific product and obtain specific results without full knowledge of the product itself and that which is to be produced from it. We warm our homes with heat obtained from fuel; the fuel may be gas, oil, wood or coal, and the method by open grate, boiler or gas burners or otherwise, and the accessories may be of iron in each case, but the philosophy of the different methods demands a vast difference in the design.

While ordinary merchant pipe and fixtures are used with gasoline gas, the difference between its gravity and nature and that of coal and the so-called water gas demands a difference in the scheme of piping to get proper results. And almost invariably success or failure with gasoline gas work has hinged on the possession or lack of technique essential to intelligent direction of the work.

◆

National Builders' Supply Convention.

The seventh annual convention of the National Builders' Supply Association was held at the Bellevue-Stratford Hotel, Philadelphia, Pa., February 6, 7 and 8. Over 800 delegates from all parts of the United States were in attendance. The sessions of the association on the 6th instant were largely executive and were devoted to the discussion of trade and association conditions. An important amendment to the constitution relative to membership of the association was made, so as to admit to membership all builders' supply men who have been in business for five years or over, instead of restricting membership as heretofore to only those residing in towns of 15,000 population or over.



Linen Press on Second Floor.—Scale, ⅜ Inch to the Foot.

Elevation of Main Stairs.—Scale, ¼ Inch to the Foot.

Miscellaneous Constructive Details of Dutch-Colonial Frame Dwelling.

On Tuesday evening a theatrical performance was given the members, their ladies and guests, in the Clover Room of the hotel. Wednesday was devoted to the reading and discussion of papers of interest to the trade, and on Wednesday evening a smoker and lunch was given the manufacturers, their representatives and guests in the ballroom of the hotel, for the purpose of promoting closer business and social relations between the manufacturer and dealer.

The convention ended its deliberations of the 8th inst. with an election of officers for the present year. Gordon Willis of St. Louis, Mo., was chosen president, the 18 vice-presidents elected being H. C. Godfrey, Bridgeport, Conn.; Charles Warner, Wilmington, Del.; C. O. Perkins, Des Moines, Iowa; A. W. Eisenmayer, Granite City, Ill.; D. L. Mather, Richmond, Ind., T. W. Spencer, Louisville; John K. Kelley, Baltimore; J. G. Lincoln, Boston; S. A. Mormon, Grand Rapids, Mich.; N. P. Cockey, Minneapolis; H. W. Cutcheon, Kansas City; W. P. Cook, Newark; M. A. Roab, Buffalo; E. C. Kissinger, Columbus; Grant Murray, Pittsburgh; B. L. Grove, Washington; R. W. Marshall, Wheeling, W. Va.; C. P. Flatby, Green Bay, Wis.

◆

Relative Cost of Brick and Frame Structures.

The subject of comparative cost of erecting the walls of dwellings of brick and of lumber has developed no little discussion in the past and the topic coming up in course of conversation with a builder who was engaged in erecting a brick structure, he was asked his opinion as to the cost of the two forms of construction. He replied that he had figured it out very carefully before deciding what material he would use in the construction of the building upon which he was then at work and his figures showed that the cost for lumber to frame his walls, sheathing, building paper, weather boarding, etc., and the lath on the inside footed up more than it would cost for brick to build the same walls. After the walls were erected, however, he found it cost more to put up the walls that it would to have employed carpenters and erected frame walls, the difference in the cost of doing the work wiping out the saving in the cost of material by using brick. This, it might be remarked, was in a clay section of the country, where brick are produced at a very low figure.

◆

THE plans have just been filed by Clinton & Russell, architects, for the mammoth apartment house which will be built for William Waldorf Astor, on the block bounded by Broadway, West End Avenue and 78th and 79th Streets, New York City, and reference to which was made in these columns some time ago. The structure will be 12 stories high, with a façade of brick trimmed with limestone in the modern Renaissance style of architecture. There will be accommodations for 109 families, with extra guest rooms and extra quarters for servants. The building is estimated to cost $2,000,000, and will be known as the Apthorpe Apartments. The contract for the work has been awarded to John Downey of New York City.

NEW YORK STATE ASSOCIATION OF BUILDERS.

THE tenth annual convention of the New York State Association of Builders was held at Niagara Falls, Wednesday, January 31, 1906, and proved to be the most pleasant and profitable gathering in the history of the State organization. In attendance at the convention were 165 delegates, representing 12 different cities and 20 different organizations affiliated with the State body.

NAMES OF DELEGATES.

Albany, N. Y.—Peter Blake, R. Wickham.

Buffalo, N. Y.—H. Tilden, G. Flynn, F. Kempf, P. Christman, F. N. Farrar, B. I. Crooker, G. M. Springer, J. H. Black, T. M. Dyer, W. B. Ogram, Henry Rumrill, Jr., F. T. Coppins, F. W. Carter, J. M. Carter, W. S. Crooker, J. J. Nailer, M. G. Farmer, J. P. Hunt, A. Feine, C. H. Gill, E. D. Hofeller, G. W. Morris, Wm. Allan, M. A. Reeb, E. Fleming, Jno. Lannen.

Dunkirk, N. Y.—Peter Meister.

Elmira, N. Y.—C. T. Spaulding, R. Thurston.

Ithaca, N. Y.—W. L. Jenks, Wm. Driscoll.

Jamestown, N. Y.—Chas. Linbeck, Chas. Swanson.

New York, N. Y.—Chas. A. Cowen, Luke A. Burke, Chas. F. Hart, Stephen M. Wright.

Niagara Falls, N. Y.—F. J. Allen, C. A. Allen, John Pitman, W. J. S. Cowdrick, John Lennon, Sr., John Lennon, Jr., C. Braas, N. Braas, W. Mack, J. Laper, W. H. Gillett, W. W. Snyder, J. Gallinger, F. Hartmann, J. Speicher, O. E. Whitmire, J. E. Wallace.

Rochester, N. Y.—Fred. Gleason, J. J. Mandery, Henry Stallman, B. F. McSteen, Henry Stallman, Jr., Geo. G. Muntz, F. L. Heughes, Simon Beiselm, Geo. Swan, W. M. Albaugh, F. C. Lauer, Walter Whitmore, F. C. Seitz, Charles Carson, John Kerweick, J. J. L. Frederich, C. F. Keith, Martin LaForce, William Saucke, J. Young, Charles Hasenauer, Joe Meyer, C. Vogel, G. H. Swan, J. Hammill, P. Hauck, A. E. Beale, Edward Strauchen, H. H. Edgerton, S. W. Hagaman, J. E. Summerhays, M. H. Dockstader, George Garrison, Charles Hetzler, Frank H. Phelps, G. Henry Fisk, Joe Barr, L. S. Whitmore, F. E. Witherspoon, N. L. Brayer, Frank Binsack, F. J. Sauer, W. A. Perkins, J. H. Schoenheit, Henry Husmann, Wm. Livingston, Charles Kohlmetz, Geo. Kingston, C. C. Mayar, J. Pierrefant, Wm. Haas.

Utica, N. Y.—M. Doll, H. Kasing, W. Hughes, R. Loyad, C. Marshal, S. Sherry, W. Fisher.

The meeting place of the convention was the palatial Powers Hotel. The morning session was called to order at 10.30 by President Chas. A. Cowen.

Mr. Braas, representing the Builders' Exchange of Niagara Falls, extended a cordial welcome to the delegates and presented Mayor Cutler of Niagara Falls, who extended greetings on behalf of the citizens of that place. President Cowen, on behalf of the delegates, expressed appreciation of the welcome given.

The rest of the morning was taken up with detail reports of secretary and delegates. The former's report showed the association had made pleasing gains in membership and influence the past year; gave reports from builders' exchanges of various cities, which showed a glaring need of more apprentices in the trades associated with the building crafts, and urged that the apprentice problem, its causes and cure, be given earnest consideration by this body.

Reports from the delegates, telling of the supply and demand of workmen in the building crafts and the wage scale paid them in various cities, showed that in most cases the need of good mechanics was greater than the demand, and the wages paid them in this State a little higher than that paid in neighboring States.

The meeting adjourned at 12.30 for luncheon and reconvened at 2, at which time the report of Ernest F. Eidlitz, counsel of the association, was read. Mr. Eidlitz, because of several important cases before the New York courts, was debarred from attending the convention.

The following are extracts from the report:

> In compliance with the request of your secretary, James M. Carter, for a summary of the legislative work done during the past year I beg to submit the following:
>
> There were introduced in all 2639 bills. Of this number 1604 were introduced in the Assembly and 1035 in the Senate; in all 260 more bills than last year. All these bills were examined and those of importance affecting the building interests were submitted for your consideration. A good many of these were disposed of as not materially affecting the building interests.
>
> This year the committee went a step further than heretofore and undertook the introduction of a bill amending the Labor law in respect to guarding elevator shafts in buildings in course of construction. The bill is now a law.
>
> Altogether the committee took definite action on over 50 bills, besides certain measures in the United States Congress and several local ordinances.
>
> All of the bills opposed by the committee failed to pass the Legislature, and each of those which the committee made an effort to have passed became a law.
>
> The record therefore for the past session was highly satisfactory and looks encouraging for the present session.
>
> The success of this work is largely due to the active, responsive part taken by all those interested and their willingness to comply with the requests and directions of counsel.

Election of Officers.

A Nominating Committee, composed of one member from each association represented in the convention, with Stephen M. Wright of New York acting as chairman, nominated the following, who were duly elected to serve as officers of the association for the ensuing year:

President, Fred. Gleason, Rochester.
Vice-president, B. I. Crooker, Buffalo.
Secretary-treasurer, James M. Carter, Buffalo.

An amendment to the constitution was offered creating the office of second vice-president, and Stephen M. Wright of New York was elected to the office thus created.

E. F. Eidlitz of New York was engaged as counsel of the State body for the ensuing year.

Resolution on Apprentices.

A general discussion by delegates present on the needs of employing more apprentices in all trades of the building lines resulted in the resolution as given below being presented and unanimously adopted:

> Be it hereby resolved, that the New York State Association of Builders in annual session assembled urge upon all its members the necessity of giving the apprentice question the most careful consideration the coming year. It being plainly evident from a report of all delegates present at this convention that there is a shortage of men in all the mechanical trades associated with the building lines, it therefore clearly becomes the imperative duty of every master builder of the State and not only of this State but of every State in the Union to employ all the apprentices that their capacity will allow, and having engaged these apprentices should expend every effort in seeing that the boys are given both a thorough, practical and mechanical training, to the end that the American tradesman shall be the peer of those of all other countries.
>
> We believe that organizations of both employers and workmen should work individually and collectively in the carrying out of the precepts of this resolution.

The Banquet.

At 6.30 a delightful banquet was served in the banquet hall of the Powers Hotel, all delegates being the guests of the Builders' Association of Niagara Falls. After the good things to eat had been consumed S. M. Wright, acting as toastmaster, introduced Daniel Upton, superintendent of the Mechanical Training Schools of Buffalo, who spoke on "The Needs of a Mechanical Training," and A. H. G. Hardwicke, secretary of the Employers' Association of Niagara Falls, who spoke on "Trades Unionism and Employers' Associations."

Needs of Mechanical Training.

Both speakers proved themselves masters of their subjects. We present extracts from the talk of Mr. Upton as follows:

> It seems almost preposterous for one to stand up tonight and in face of the fact that America to-day is experiencing the greatest commercial prosperity ever known in the world, to advance anything but the most optimistic thoughts for the future; but there have been times in the lives of other nations when their prosperity was fully as great as ours is to-day and when the permanence of their hold on their commanding position seemed fully assured as does ours now, and yet these same nations from one cause or another have been reduced to poverty and in some cases even to national paupers. The fact is, that we have seemingly an unexhaustible natural supply of raw material, and the greatest home market in the world, and we have been utilizing both at the most extravagant rate and the momentum of

achievement has enabled us to outstrip our competitors, but there are other factors that are entering into the commercial struggle, with which America in the near future must contend. Some are from without and some are internal matters.

Speaking of the dangers that are threatening from without, I might cite the fact, which you gentlemen all know, that Germany is making a tremendous struggle and with most gratifying results to the German people in the fields of manufacture and commerce, and the greatest element in all Germany's wonderful advance in the last few years is the schooling which she is giving to the trade classes throughout the empire. Through the means of what is known as their trade schools every mechanic in the German Empire is given an opportunity and encouraged to take it of perfecting himself in all the details of his trade and in the sciences which have particular bearing upon the line of work, which he may be studying. These schools are operated in the evening and Sundays, in some cases, in order to provide an opportunity so that the mechanic may provide a livelihood for himself and family, and at the same time perfect himself in his trade. Not only is Germany excelling us in manufacture, but she is training a most able corps of young men, who from their advanced position are making known to the world the superiority of German goods, and through this system of training her mechanics she is certainly working herself into a position which makes her at least a formidable opponent.

England has seen the necessity for this same sort of training and is to-day spending millions of dollars in trying to climb back, through the medium of education, to her former position of superiority in commerce. The Japanese, with their wonderful adaptability to all lines of manufacture, are a people with whom the mechanics of this country must sooner or later come into competition, and, if a coalition of the forces of the Japanese and Chinese would be brought about, no one can tell what the results of this combination would be. These are some of the problems which confront our country, but within there are also matters which must be considered.

With the practical elimination of the old style apprentice system the chances for thoroughly learning a trade have been nearly wiped out. One cannot in a brief talk go into the pros and cons of the merits of the new system, but the fact remains that in the subdivision of labor modern industrial organizations have taken care that the individual does not have the chances to perfect himself in his line that formerly were possible, and his all-round adaptability is very much reduced. On the other hand, I believe, it would be admitted that no matter how cunning we may make our automatic machines the all-round intelligence of the operator of the machine, in no matter what industry we may choose, is a large factor in determining the amount and quality of the output. The question resolves itself then to this: the American mechanic of the future must be in competition with the mechanics of the world. The intelligence of the average workman in reference to his trade will be the determining factor in this struggle. Manufacturing conditions of to-day preclude the possibility of giving the highest class of instruction to the mechanic while at work. The natural conclusion is therefore that the school, either public or endowed, must supply to the American mechanic an opportunity for perfecting himself in the highest possible sense in his trade if he is to cope on equal terms with other progressive nations.

The schools of this nation are for the benefit of the nation, and the nation is composed to a large extent of laborers, in fact, all who are not laborers are not worth counting. Granting the fact that the day schools should carry on such instruction as would give ordinary intelligence to the future citizens, is there not also a place in these schools for an instruction which would give mechanics of the country such a training as will best fit them to protect American industries whenever the struggle for supremacy may come with other nations? I believe there is an entirely legitimate field for such instruction in the public school system, and I base my conclusion upon observation extending over ten years in the service of the Technical Evening High School of the Buffalo High School. In this school the aim has been not so much to teach manual skill, which can best be had under other conditions, as to teach the mechanic the applied sciences which may be made to serve him in his work and extended fields of his trade—namely, in the steam fitting class we do not care to teach the man to chalk a joint or cut a thread, but we do give him the physics of the boiler, circulation, hot water or steam, the carrying capacity of pipes, the mechanisms and adjustments of the latest appliances, which may have come into the market for his trade. In the gas engine class the work is not confined to what levers to pull, but we do give an explanation of gases, and a thorough knowledge of the points on complete combustion. The student studies not only the mechanisms of the gas engine, but its correlation to locomotion, and so on in all lines of trade we are trying to make the young men think more and give them greater knowledge, which they may apply to their every day work. The success of the school has, I feel, become assured.

There are in regular attendance at the end of the seventeenth week of school about 300 men from 12 different trades, and we are continually hearing of promotions for the students of our schools. In fact, had I the time I could show you, I am sure, of how practically all of our students who have been with us for three years have bettered their positions and have made themselves more valuable to their employers.

But such schools cost money for instructors, laboratories and equipments, and I ask you gentlemen of the New York State Association of Builders whether it may not be your duty to take up the matter in your own cities and create a public opinion, which will back up the authorities in their requests for moneys for the city treasury, in order that such schools, where the American youth may receive a thorough training in his trade, may be established and maintained at public expense?

◆

Prizes of the Architectural League.

The delegates of the Architectural League of America were the guests of the Architectural League of New York at a dinner February 2 at the Fine Arts Building, in West Fifty-seventh street, covers having been laid for about 250 people. President Richard H. Hunt of the Architectural League of New York presided and George B. Post welcomed the delegates and explained the purposes of the league. At this dinner the prizes for the twenty-first annual competition for the medals of the league were presented. The gold medal, given for a prize for a small chapel to St. Peter, was awarded to George A. Licht of New York, the silver medal for the same subject being secured by C. M. Craig of York, Pa.

The president's prize, a bronze medal for mural painting, was awarded to Hugo Ballin of New York, the subject being "The Conclusion of Peace After War." The Henry O. Avery prize for sculpture was captured by A. C. Skodik of New York, the subject treated being a drinking fountain in a city street.

The winning designs were all on exhibition and among other decorations were Blashfield's sketches for fragments of decoration in the Church of the Saviour, Philadelphia; Cass Gilbert's photographs of the Minnesota Capitol, the battle scene of the Bon Homme Richard and Serapis by R. T. Willis, and the "Escape of the Constitution," by the same artist.

◆

A Novel Amusement Tower.

A company has recently been organized for the purpose of putting up at Coney Island, N. Y., an amusement tower 700 feet high to contain at various altitudes a roof garden, hippodrome, dance hall, revolving café, observatory, palm garden, etc. It is to have a diameter of 300 feet and contain 500,000 square feet of floor space. The hippodrome will be 250 feet above the ground, the café and dance hall 300 feet, the palm garden 400 feet, and so on, until the observatory and wireless telegraph station are reached, nearly one-eighth of a mile above the surface of the earth. Ten large electric elevators will lift and lower the crowds, and it is estimated that the tower will have a capacity for all the people who are likely to visit it. The cost is estimated at about $1,000,000. In the top of the structure are to be a Government Weather Bureau and a mammoth searchlight. The entire structure is to be festooned with electric lights.

◆

ANTIQUATED building laws are responsible for delay in the introduction of the steel frame building into London. It is required that the thickness of external and party walls shall follow certain schedules based upon the hights of the buildings to be erected. For a building 120 feet high the first story must have a thickness of 34½ inches; second and third 30½ inches; and so on, until the top floor has a wall 13 inches thick. This results in taking up a large amount of valuable space and completely nullifies one of the main reasons for the modern type of construction. The use of these extremely thick walls is very expensive and has little to commend it.

CONVENTION OF BRICK MANUFACTURERS.

THE twentieth annual convention of the National Brick Manufacturers' Association of the United States, together with that of its allied organization, the American Ceramic Society, was held in Philadelphia, Pa., during the week beginning February 5, the headquarters of the business meetings of the associations being at the Continental Hotel.

The American Ceramic Society opened its session on Monday, the 5th inst., continuing during Tuesday and Wednesday, the 6th and 7th insts. The reading of papers on ceramic art was the feature of this meeting. On Tuesday evening an illustrated lecture on "Producer Gas and Its Adaptation to the Ceramic Industry" was given by Samuel S. Wyer of Columbus, Ohio.

At an executive session of the association the following officers were elected to serve for one year: President, W. D. Richardson, Columbus, Ohio; vice-president, S. Geitsheek, St. Louis, Mo.; secretary, Edward Orton, Jr., Columbus, Ohio, and treasurer, Ellis Lovejoy. W. D. Gates, the retiring president of the society, was congratulated on the progress made by the society during his administration.

The National Brick Manufacturers' Association began its deliberations on Wednesday, the 7th inst., and continued during the remainder of the week. About 500 delegates were in attendance. Mayor John Weaver of the city of Philadelphia welcomed them to the "City of Brotherly Love" at the opening session, to which George M. Fiske, Boston, Mass., responded. After the annual address of the president, J. M. Blair, and the report of the treasurer, the election of officers for the ensuing year was held, with the following result: President, John Copeland, Birmingham, Ala.; first vice-president, Wm. Conway, Philadelphia; second vice-president, M. E. Gregory, Corning, N. Y.; third vice-president, Lemon Parker, St. Louis, Mo.; secretary, T. A. Randall, Indianapolis, Ind.; treasurer, John W. Sibley, Birmingham, Ala. On the Committee on Technical Investigation, of which Prof. Edward Orton, Jr., is permanent secretary, D. V. Purington, Chicago, Ill., whose term expired this year, was re-elected.

The twentieth annual dinner of the association was held at the Continental Hotel on Wednesday evening, the 7th inst., under the auspices of the Brick, Tile and Terra Cotta Association of Philadelphia. The Hon. John R. Huhn of the local association acted as toastmaster. Addresses were made by Thomas F. Armstrong, Hon. John Weaver, Wm. H. Sayward, Hon. Chas. Emory Smith, Edwin C. Stover, John S. Stevens, Wm. H. Wilson, Lewis W. Penfield, D. V. Purington and Prof. Chas. F. Binns.

The second and third days' sessions of the convention were given over to the reading of papers, among which were the following: "The Signs of the Times," by G. W. McNees, Kittanning, Pa.; "The Business End of Brick Making," by G. M. Springer, Buffalo, N. Y.; "Drying Brick by Waste Heat from Up Draft Kilns," by Geo. H. Clippert, Detroit, Mich.; "The Permanent Improvement of City and Country Roadways," by Chas. Deckman, Cleveland, Ohio; "The Rattler Process as a Safe Method of Disclosing the Permissible Absorption of Paving Brick," by Prof. Edward Orton, Columbus, Ohio; "Brick, the Universal Building Material," by F. W. Fitzpatrick, Washington, D. C.; "Electric Power for Clay Plant from an Engineer's Point of View," by Victor C. Vance, West Point, Iowa; "Brick Making on the Pacific Coast," by E. O. Simmons, Los Angeles, Cal.; "The Application of Refractory Materials," by A. J. Aubrey, St. Louis, Mo.; "Application of Heat and Removing Vapor from Various Clay Wares," by W. C. Mitchell, Edwardsville, Ill.; "Biography of Clays," by Ross C. Purdy, Champaign, Ill.; "Economy of Increased Production," by Marion W. Blair, Chicago, Ill.; "Value of Producer Gas to the Brick Industry," by S. S. Wyer, Columbus, Ohio; "Burning Drain Tile in Continuous Kilns with Producer Gas," by J. M. Powell, Brooklyn, N. Y.

During the sessions of the associations the ladies in attendance were conducted as guests of the Brick, Terra Cotta and Tile Manufacturers' Association of Philadelphia on tours throughout the city, visiting the many points of interest. A theater party was also arranged for Thursday evening.

After adjournment on Friday morning many of the delegates visited the local and near by brick and terra cotta plants, while side trips to Atlantic City and to New York were also made. While it was not definitely decided where the next convention of the association will be held, the choice being left to the Executive Committee, it has practically been decided to hold it in St. Louis, Mo.

Convention of Northwestern Cement Products Association.

THE second annual convention of the Northwestern Cement Products Association, which was held the third week in January, was a most interesting affair and much profitable discussion of trade topics ensued. The sessions opened with President O. U. Miracle in the chair. After some routine business Lee Stover of Watertown, S. D., spoke of the cement block industry, covering the field in most attractive style. He referred to the great need of a "fast coloring matter and of the means of preventing efflorescence on blocks." He stated that what was also needed was a block that was damp proof and water proof so as to save the necessity of using lath. If, he stated, lathing is necessary and cannot be dispensed with, how deep should be the furring, and if blocks are damp and frost proof, how shall they be laid up so that the joints will not leak? He urged a "Question Box" running through the year conducted by some trade paper, where difficulties could be propounded and answers given by those who had overcome them.

Arthur N. Pierson of New York had something to say on "Some of Our Troubles and How They Came About." He criticized the literature of block machine manufacturers as misleading and suggested a reformation of the glowing statements. He touched upon the difference in the value and character of aggregates as having a great bearing on the proportions to be used in blocks. He pointed out that a mixture of one to five or six may make a very satisfactory block provided the aggregates are properly selected and that proper care be taken in the production of the block. In dealing with the subject of block manufacture he advocated starting with the largest aggregate, as gravel or crushed rock known as half-inch, using 20 to 35 per cent., and then grading down with a smaller stone or gravel to 50 or 70 per cent. of the bulk of the aggregate. He favored adding half of coarse and half of fine sand and the result would be a block of the greatest strength. He urged the use of different sized aggregates as saving in cement and adding to the strength.

Henry Longcope of Philadelphia presented some very interesting comments on the subject of cement piles, illustrating his remarks with stereopticon views. In answer to questions which were asked him he gave the comparative cost of cement piles to wood at one and one-half to two times the cost of wooden piles, although the shore piling and excavation make this proportion change materially. The mixture of cement piles is usually one, three and five or one, two and one-half and five, with stone of one and one and one-half, mixed sloppy wet, agitated but not tamped.

The next order of business was the address of President Miracle, which was followed with the closest attention on the part of those present. He referred to the necessity of organization and co-operation and to the great growth of the cement block industry. He pointed out that one of the most serious objections, and one at the same time most readily overcome, is that of the appear-

ance of the concrete block in the building. This comes most forcibly from the architect who takes exception to the rock face block which is so common and which in construction, he said, resembles the cheapest sheet iron effect. Nothing is easier, he pointed out, than for the block makers to get away from this uniform effect, as no material is so easily susceptible and responsive to the artistic touch than concrete. He stated that during the past year great progress has been made in securing just recognition for this material by the public, by the insurance people, by the railroads and by the United States Government. He suggested that a resolution be proposed and adopted at the meeting similar to that adopted at the convention of the National Association of Cement Users in Milwaukee the week before, asking Congress to make large provision for the continuance of the important work of investigation of cements, mortars and other structural materials, as now being conducted by the United States Geological Survey.

After the regular session the delegates were tendered an informal reception by the Builders' and Traders' Exchange at their headquarters in the Kasota Block.

The second day's proceedings were devoted, among other things, to a discussion of the question of alkali water in coloring and in general mixing, William Seafert of Chicago presenting some very interesting information on the subject. He stated that alkali had the effect of diminishing color in concrete and causing efflorescence and that mineral colors were the only ones to be used. Alkali water if used should be boiled, but rain water is much better for mixing concrete. Hydrated lime, he stated, does not effect color, but if acids are present they cause crumbling and decay. This, however, can be overcome by the use of barium sulphate or hydrates, which drain back into the stone the carbonic acid which has been expelled.

President Miracle presented a set of standard specifications as compiled by a committee of the National Machinery Manufacturers, which were taken up by sections and discussed. Concerning the question as to a mixture of one of cement, three of sand and five of coarse gravel or rock, it was the sense of the meeting that such mixture should be termed one to five and not one to eight. As to the proportion of lime and cement to be used for mortar for laying up block, some advocated 10 per cent. Portland cement and the remainder of lime, with the usual amount of sand to the whole, but it seemed to be the general belief that the mortar should be as rich as the block itself and that anything else would tend to make the joints leaky. The standard specifications for hollow blocks as finally adopted are presented in another part of this issue.

A Committee on Nominations, consisting of L. L. Bingham, E. H. Cobb and Lee Stover, was appointed; also one on place of the next meeting, consisting of J. T. Summers and William Hurst. The Committee on Resolutions consisted of Ed. E. Smith, E. L. Welch and A. H. Laughlin.

Next in order was a paper on the "Concrete Block Industry of the Future as Indicated by Past Experience," by A. P. Melton of Minneapolis. One of the most interesting features of the day's proceedings was a practical talk by John Wunder of Minneapolis, who has probably built more reinforced concrete structures in the city than any other one contractor. He referred to completing the third floor and roof slab of a manufacturing building at a time when it was very cold and he had to put in 30 salamanders, using coke fuel. The results were very good, for the slabs so dried were smooth, clean and impervious. A soft mixture was used, 13 to 15 per cent. water in the concrete. The heat and carbonizing effect of the coke served to glaze the slab. In his opinion coke and steam should be used for curing concrete blocks, as dry concrete blocks exposed to the weather would absorb moisture. He was of the opinion that crushed gravel made a stronger and better block than the accompanying gravel of the size to be used, uncrushed. He advocated care in watering blocks, as he believed efflorescence to be due to washing the cement loose so that it came to the surface or else went to the bottom. Steam, he stated, afforded a gradual moisture, while the ordinary wetting dashes the block and does not keep it steadily moist; too little moisture on blocks starves the cement and too much fluxes it, either being harmful and no doubt accountable for some of the troubles experienced. Mr. Wunder was followed by Mr. Peterson, who gave some interesting information about sidewalk building, and then C. A. P. Turner delivered an address on reinforced concrete construction, predicting that such progress was being made that it will soon become so reduced in cost as to be much cheaper than other forms of construction.

The Committee on Nominations reported the following ticket, which was elected, the secretary casting the ballot:

President, C. A. P. Turner, Minneapolis.

VICE-PRESIDENTS.

Cement and Aggregates Section—A. H. Laughlin, Lisbon, N. D.

Machines and Equipment Section—O. U. Miracle, Minneapolis.

Cement Blocks Section—Lee Stover, Watertown, S. D.

Concrete, Other Than Blocks—John Wunder, Minneapolis.

Engineers and Architects—E. W. Dow, Sioux Falls, S. D.

A motion prevailed urging the Executive Board to reelect George A. Hughes as secretary and John M. Hazen as treasurer, which prevailed, and the board took this action at a subsequent meeting. A committee of five, consisting of C. A. P. Turner, Lee Stover, L. L. Bingham, Mr. McCormick and John Wunder, was named to arrange for an official organ of the association, the choice to be a paper solely representing concrete.

Not the least interesting feature of the convention was the large number of exhibits of brick and block machines, as well as materials and appliances connected with the cement industry.

The Trinity Building as a Firestop.

A rear view of the new Trinity Building in New York City shows an area of Mississippi wire glass windows seldom equaled. Such structures as these, says Perez M. Stewart, writing in the *Insurance Press*, when properly protected against exposure attack have a large public value. They stand as great barriers against the progress of sweeping conflagrations, protecting not only themselves but all structures to the windward. They are distinct additions to the welfare of the community. Had such forethought marked the design of great structures in Baltimore a very different story would be told. Not many years ago a fire occurred in New York which taught lessons. A clothing store next to the Home Life Building took fire and spread to the latter. The fire was checked by the blank fire proof wall on the south side of the high building. Two points were brought into view: the value of fire proof walls in checking conflagrations and the necessity for inclosing tall buildings on all sides by such walls, for had the Home Life been provided with suitable window protection on the north it would have performed a valuable service as a fire stop and would itself have escaped destruction. These lessons were well taken by the designer of the Trinity Building.

Preparing a Canvas Covered Porch Floor.

Answering a correspondent of that journal who asks how to prepare a new second-story porch floor to be covered with canvas and then painted, a recent issue of the *Painters' Magazine* has this to say: "The floor should be oiled first and then coated with a very stout pure lead and oil paint, in which the stretched canvas is laid and nailed down with galvanized iron tacks. The canvas is then given a good coat of pure lead and linseed oil paint, on which a finishing coat of good floor paint should be applied."

◆

IT is stated that all records in hotel building were broken in the erection of the new Profile House at the head of Franconia Notch in the White Mountains, which was constructed for Hon. Charles H. Greenleaf, a member of the Governor's Council. In just 11 weeks the new house, four stories high and 1400 feet around the eaves, was boarded, sheathed and shingled and the steam heating plant installed, so that the plumbers, plasterers and electricians can work all winter and have everything complete for an early spring opening.

LAYING AND FINISHING HARDWOOD FLOORS.*

By Frank G. Odell.

THESE have their desirable points, chief among which are the ease of their application and the possibility of a quick finish when left in the gloss. The preparation of these finishes has now reached a degree of perfection, so that cracking and showing of heel marks has been largely obviated. For floors subjected to the minimum of wear, as bedrooms, &c., they are among the most desirable finishes. They are also specially suitable for tenant houses, owing to the fact that a yearly renewal of the surface is usually sufficient to keep a fairly presentable appearance, while wax requires more frequent attention.

The surface being filled with a paste filler, if of a wood requiring a filler, and all cracks, nail holes, &c., carefully puttied, apply the varnish according to manufacturer's directions, giving ample time to dry. Two coats over filler or stain will give a very satisfactory job, though three coat work is recommended.

The writer gives preference to Pratt & Lambert's No. 61 Floor Finish, or Berry Bros.' Liquid Granite, as the most satisfactory varnishes within his knowledge.

It should be said with reference to varnish finishes that no varnish should ever be put on a floor unless specially made for that purpose, and that liquid fillers should not be used, for they are not made of the elastic materials required for the hard wear to which the floor is subjected. Most makers of floor varnishes explicitly specify that liquid fillers are not to be used on floors.

Fig. 13.—The Weighted Brush.

Laying and Finishing Hard Wood Floors.

A very cogent objection to varnished floors is that the unusual wear to which they are subjected causes the finish to wear off in spots indicated by the line of general travel across the room, and that when once worn thus unevenly no amount of labor can restore the surface to its original state of finish.

While it is true that a fairly good general appearance may be given to the floor by a coat over the entire surface, it is equally true that it is impossible to patch the worn places, and nothing short of going over the entire room will repair the damage done by passing feet.

No technical directions as to rubbing and general precautions are deemed necessary in the limits of this paper, for it must be said in justice to the craft that the majority of painters who have arrived at the dignity of finishing work are competent and careful workmen.

Wax Finishes.

These possess all the desirable requirements for a satisfactory floor finish when properly applied. Use the same ground work as for varnish. If a high gloss finish is desired use a first-class floor varnish for second coater, leaving ample time for drying and rubbing lightly before applying the wax. Preference is given to this rather than to shellac, which is so commonly used and specified by so many manufacturers and architects, because of the extreme slipperiness of shellac and the added fact that it cracks easily. The latter fault alone should be sufficient to condemn it for floors. When one considers that much of the commercial shellac is liberally adulterated with glue, and other substances not so durable, sufficient argument will be apparent against its use as a floor coating.

Some manufacturers now put out a "Floor-Lac," or substitute for shellac or varnish, as a second coater which may be used with entire satisfaction where the high gloss effect is desired.

When it is considered, however, that the gloss of a wax finish deepens with age and constant polishing, it will be found quite satisfactory to wax directly over the filler, and many of our finest jobs are now finished in this manner. The writer recalls a very fine oak floor which was finished in this manner for one of his most exacting clients, purely as an experiment, and which has proven an entirely satisfactory job and is constantly improving with the occasional renewals of surface which it receives.

There is a peculiar degree of cohesion attainable by the union of wax and paste filler which is not attainable with any of the highly elastic and glossy second coaters, adding greatly to the wearing quality and affording a depth of gloss and mellow reflection which cannot be afforded by the superficial gloss of the hard undercoating so often resorted to. This style of finish is unqualifiedly recommended with the knowledge that it will prove entirely satisfactory to the most exacting.

Considerable natural prejudice exists against waxed floors in the belief that the finish is one requiring an unusually high order of skill to prepare and keep in condition. Nothing could be farther from the truth. Any good painter can wax a floor satisfactorily and any house wife can keep it in condition if possessed of sufficient bodily strength to manage a weighted brush.

In selecting a wax finish give preference to the paste preparations, which are rubbed on with a woolen cloth. The surface should be properly prepared with filler, &c., and thoroughly dry, the room warmed to a comfortable temperature if possible. The surface is lightly rubbed with the waxed cloth, being careful to spread the wax evenly and not too thickly. About 30 minutes should be allowed for the wax to partially dry and then the surface should be gone over with a weighted brush, such, for example, as that shown in Fig. 13.

Brush crosswise of the boards first, covering the surface three or four times, and finish lengthwise. This distributes the wax evenly and lays the foundation for a fine polish. If the room is to be occupied immediately a second coat may at once be applied and brushed in the same manner, using a piece of Brussels carpet under the brush for the final polishing. The use of the carpet will give a beautiful gloss, which may be increased by its frequent use as often as may be desired.

Waxed floors should have a coat of wax at least once in three months, being careful to remove all dirt and dust from the floor before waxing. In the absence of any specially prepared cleaner a soft cloth slightly dampened with kerosene will take off soiled spots very quickly, being careful not to use too much of the oil, as it will soften the wax. Avoid soap and water, especially hot water, on waxed floors, although a slightly dampened cloth may be used without detriment. The general caution to never wax over oil or to use turpentine as a cleaner should be observed, but the slight quantity of kerosene adhering to the surface in cleaning in the manner recommended will speedily evaporate. After cleaning a floor should never be waxed until entirely dry.

This additional advantage pertains to wax, that worn spots may be waxed without going over the entire surface and the job will look as good as new. The extreme slipperiness of wax will be found to be materially reduced if it is done directly over the filler. I am aware

---

* Continued from page 52, February issue.

that this method is not generally recommended, but in the cases in which it has been followed in my experience it has proven entirely satisfactory.

The chief and final advantage of wax to which I shall refer is that it brings out and enhances the natural beauty of the wood with a soft and mellow depth of lustre which cannot be attained by any other preparation with which I am familiar. This beauty of finish, instead of deteriorating, increases with age and subsequent applications. It is practically proof against heel marks or scratches and is easily kept in repair without calling in the aid of an expert craftsman.

A word of caution should be given here which may be well passed on to the family who are to live over the floor you have finished. No floor which is properly finished will remain in a satisfactory state long unless care is taken to prevent excessive wear. Shoes with nails projecting or covered with dirt are as much out of place on a polished floor as they would be on the top of the piano or parlor table. Care should be taken to avoid dragging or rolling heavy furniture over the floor and a good cleaner should be placed at the outer door for the shoes of visitors. A floor once mutilated can never be restored to its first estate, and the one who finishes the floor owes it to himself and his client to fix these precautions firmly in their minds.

One of the most unsatisfactory tasks which comes to the mechanic is to be called on to refinish an old floor which has been spoiled in the beginning. In such cases one must be governed entirely by the conditions and the desires of his client. If they are willing to pay for a good job the best thing is to take off all the old finish with varnish remover and steel wool and have the carpenter scrape an entirely new surface on the floor. In this manner a job may be made as good as new, although it generally entails more labor and expense than to have done a good job in the beginning. Such undesirable tasks are usually due to poor carpenter work or poor painter's work, or a combination of both, and should serve as a warning to have nothing but the best in both labor and materials.

(*To be continued.*)

Specifications for Lightning Protection.

A committee of the National Fire Protection Association has, after conducting numerous experiments and examining available data, formulated specifications for a standard lightning rod. This rod is not covered by any patents, and it is believed that competition will result in making an equitable price to all parties. Information recently given out by H. D. Davis, State Fire Marshal for Ohio, includes the following abridged specifications:

Protection against lightning is advisable on isolated buildings, and on all buildings having tall chimneys, steeples, high peaked or gable roofs or flag poles. One rod with proper air and earth terminal is recommended per unit of roof area as follows: Pitched roofs of metal, one each 2000 square feet of ground area; pitched roofs other than metal, one each 5000 square feet of ground area; flat roofs of metal, one each 5000 square feet of ground area. Air terminals should never be more than 50 feet apart and each should be provided with its individual ground. A low, broad building of greater area than 75 x 100 feet can best be protected by an additional rod through the center of the building.

The air terminal to be placed at the highest point of the roof or structure. Where there are two or more gables, or other projections above the roof of nearly equal hight, each to have an air terminal and all to be connected together. Where trees stand so close to a building that branches overhang or approach very close to the roof a conductor with proper earth terminal to extend along the trunk of each tree to near the highest branch top fastened by a band around the branch or trunk and equipped with a cluster of points.

Conductors to be put in sheet or tape form of either copper, weight not less than six ounces per foot, or iron weighing not less than 2¼ pounds per foot, the latter to be painted or galvanized to prevent corrosion. One-inch iron rod can be used to connect iron ground with copper conductor, the conductor terminating above the surface of the ground. Air terminals to be rods of iron or copper, not less than ¾ inch in diameter, with point cone shaped and hight of cone equal to the radius of the base. One foot below the point there should be a casting holding four copper points. Large chimneys should have a band of iron or copper not smaller than the conductor around the top 6 inches below the corbeling, and provided with copper point 1 foot long and ½ inch in diameter. Terminals should extend not less than 3 feet above roofs or chimneys. Terminals can be satisfactorily made of ¾-inch copper or iron pipe.

All joints to be made mechanically and electrically secure and then soldered. To be run down side of building where best ground is obtainable, preferably on the side most exposed to rain. Not to be run nearer than 5 feet to interior piping unless absolutely unavoidable. To be run as straight as possible, avoiding all turns of radius of less than 1 foot, and to incline downward throughout its entire course. Should never be insulated, but fastened securely to the surface. Must never be run through iron pipes.

Connections to be made with iron piping or castings to be made by screwing a brass plug into same and fastening conductor securely to it, then soldering. Or, with copper ground, by riveting and soldering, the connection then being coated with asphaltum paint. A copper plate not less than 2 x 3 feet by 1-16 inch buried in permanently damp earth, not less than 4 feet below the surface, with 3 inches of crushed coke or charcoal underneath, and the same material above to within 6 inches of the surface of the ground. Or an iron casting so shaped as to have a number of pockets or cups facing upward. Should have not less than 6 square feet of surface. Should be buried with not less than 6 inches of scrap metal and coke under and 6 inches over same.

A proper ground is absolutely essential, and permanently damp earth is absolutely required.

State Building Laws.

The heavy fire loss which has occurred in the United States during the past two years has forcibly directed attention to the necessity of uniform State building laws, as it is argued that a large portion of the fire loss is due to the absence of building regulations in the minor cities and towns. The building law which has been receiving consideration in the Massachusetts Legislature is designed to give equal protection to the same class of structures throughout the State. It is urged by its sponsors that millions could be saved by certain changes in construction of buildings in every municipality. They would add something to the cost of construction, but it is claimed that this would soon be met by the reduced insurance premiums. In the majority of the small towns of the country the protection against fire is generally very inadequate, and only in rare instances are buildings erected in accordance with what is known as slow burning construction, so that the practical wiping out of a goodly portion of a town or village is not an uncommon occurrence. The promoters of the Massachusetts legislation appear to be convinced that a well considered, uniform State building law, requiring all buildings of the same character to be safely constructed, is the only effective way to meet the situation. The comparatively small losses from fire in some of the European countries is attributed to the superior construction of buildings. In many of the smaller towns in this country there appears to exist a fatal indifference to the fire peril, and councils as a rule leave the serious question of protection from fire very largely to the voluntary action of the citizens. As a result of the agitation State building laws, with city and town ordinances in conformity therewith, are favored by local fire chiefs, insurance men and municipal officials who have given serious thought to the question of fire risk in cities and towns. This attitude is not at all surprising when it is considered that the fire loss in the United States in 1904 was over $230,500,000, and that last year it was in round numbers $162,000,000, while the insurance loss in 1905 was $97,000,000. The fire loss is variable, but it has exceeded $100,000,000 every year since 1883.

CENTERS FOR ARCHES OF DOUBLE CURVATURE*—II.

By Charles H. Fox.

We will now take up the explanation of Problem 2. Given the projections of a line oblique to both planes of projection, to find the true angle which the line makes with either of the planes of projection. In Fig. 3, let A B' represent the horizontal, and A E' the vertical projection of the line; and let A C represent the ground line. In the practical application of this problem to our subject we may take the line A C to represent the plan of the vertical face of the plank; the line A E' as the elevation of the inclined top edge of the plank, and the line A B' as representing the plan of one of the sides or end of the plank, at which we have to make a side cut. The problem is to find the angle of the bevel as required to give the proper direction for making the cut. To do this proceed as follows: At any point of the line, say, at E, and square with the ground line draw E C B; the intersection of the vertical, as at B, determines the horizontal projection of the point E of the line. The point E is therefore at a perpendicular hight above the horizontal point at B, equal to that given in C E; which is the distance of the point in question above the ground line. Understanding this, square with A B draw B D; set off the length B D equal to that given in C E, and draw A D. This gives in B A D the true angle which the line makes with the horizontal plane. To find the angle which it makes with the vertical plane we may state that as the point B is the horizontal projection of the point E of the line, it therefore follows that E is at a perpendicular distance from the vertical plane of which A C is the horizontal trace, equal to that given in the distance C B. Understanding this, square with A E draw E D; set off the length E D equal with B C below, draw A. D; this gives in E A D the true angle which the line makes with the vertical plane.

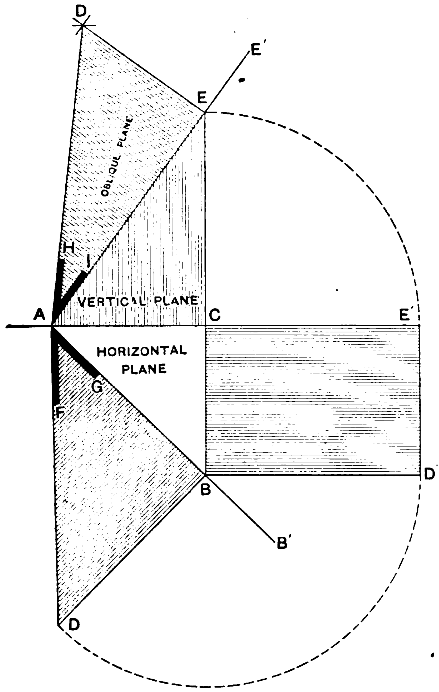


Fig. 3.—Diagrams Illustrating Problem 2.

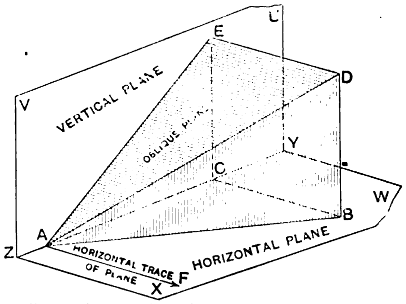


Fig. 4.—Illustrating Section of a Prism Which is Perpendicular with the Vertical Plane.

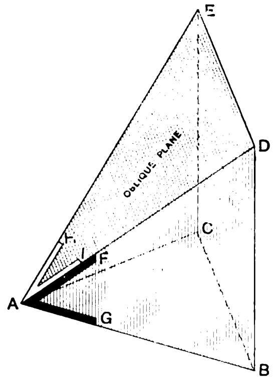


Fig. 5.—An Oblique Projection of the Solid of a Prism Cut by an Oblique Plane.

Centers for Arches of Double Curvature.—II.

Now to prove this interesting problem we first make the drawing upon Bristol board, then square with E B, draw C E' and B D, each of a length equal to that given in C E above. Draw D' E'. Now take a sharp knife and cut through the board at the outline of the drawing. Then at the lines A C, A B and A E cut about half through the board: this will admit of the sides of the model being turned around their respective base lines as on a hinge. This understood, fold the three sides vertically over the plan A B C, of course keeping the lines at the exterior of the model; touch the edges with glue and bring them together. This being done the oblique plane which forms the top of the model may be revolved around the line A E until its edge A D coincides with the edge of the side of the model, that over A B. We may in this simple manner obtain a practical proof of the constructions just made. The side A C E has now become a vertical plane, therefore it may be proved that the angle contained in E D A is the true one made by the line whose plan is given in A B below. In a similar manner may we prove the construction of the angle contained in B A D. We may further remark that in the construction of the model there has been worked out practically three problems, viz, the length of a line, as A D, oblique to both planes of projection has been found, from its projections; then the angle contained or made by the line with the planes of projections has been constructed; and lastly, but not the least, we have developed in the section A E D the section of a prism whose base is represented in A C B, when cut by an oblique plane; oblique with the horizontal, but perpendicular with the vertical plane of projection. This latter point, that of its being perpendicular with the vertical plane, may be better understood by the beginner if he will inspect the diagram presented in Fig. 4. The vertical plane is there represented in Z V U Y and the horizontal in Z Y W X. The line E D, as may be seen, is parallel with the horizontal plane, and as the planes of projection are at right angles in space; the line E D is therefore at right angles

---

* Copyrighted, 1905, by Charles H. Fox.

with the vertical plane. Now the line E D may be taken to represent an element of the surface of the oblique plane, hence the plane in question is perpendicular with the vertical plane. This may again be proven at the model, for on trial not only will the top edge, as represented in the line E D, but also the surface of the plane, be found at right angles to the vertical plane A C E. If now the student will take a perfectly flat piece of cardboard and cut one edge of it so that it is practically straight, and lay this upon the top surface of the model, he will find the straight edge just cut to intersect or meet the horizontal plane upon which the base of the model may be standing, in a line which may be drawn, as shown in A F of Fig. 4, through the point A, parallel with the line B C. This line is called the "horizontal trace," and that given in A E, the vertical trace of the plane. The student will please note that the vertical projection of the line, as first presented, has also answered as the vertical trace of the oblique plane; but not so with the projection A B of the oblique line; and as far as the drawing is concerned the line A B has no relation whatever with the oblique plane.

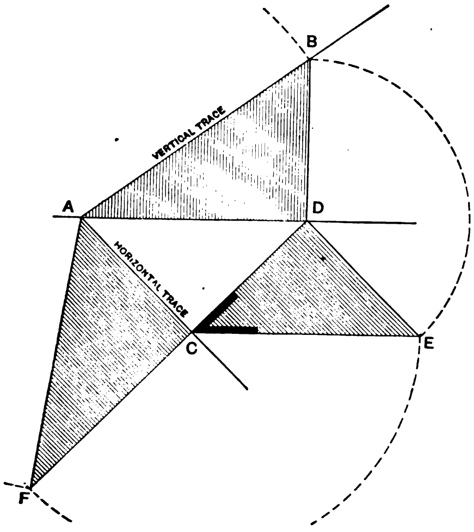


Fig. 6.—Diagrams Showing Method of Finding True Angle Which an Oblique Plane Makes with Either Plane of Projection.

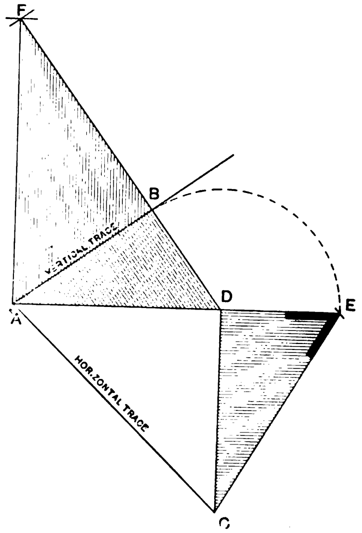


Fig. 7.—Diagrams for Determining Position of Plumb Line at Joint Surfaces of a Wreath Piece.

Centers for Arches of Double Curvature.—II.

We have just explained the simple method by means of which the student may determine the "trace" or line in which the oblique plane meets the horizontal plane of projection; we will now, in as few words as possible, state the first principles which govern the projection of the lines called "traces." Two lines which intersect, or are parallel, determine the position of a plane passing through them. If, then, the lines in which a plane intersects the planes of projection are known, the plane itself is given in position. It is by means of these lines, which are called "traces," that we are enabled to show, on the planes of projection, the position which planes have with each other in space. The line in which a plane intersects the horizontal plane is called its "horizontal trace"; and the line in which it intersects the vertical plane is called its "vertical trace."

If a plane be parallel to either of the planes of projection it will have but one trace, which will be on that plane to which it is not parallel. Thus, for example, we may take the line A C of Fig. 3 to be the horizontal trace of the vertical plane A C E, which forms one side of the model. It would be impossible to show a vertical trace of the plane, as it is parallel with the vertical plane of projection; hence the trace A C as given at the horizontal plane of the projection is that which determines the position of the plane.

If a plane be perpendicular to both planes of projection it will have two traces, both of which will be perpendicular to the ground line. For example, we may take the lines B C and C E respectively as the traces of the vertical plane which forms one side of the model, that over C B.

If a plane be oblique to either one of the planes of projection and perpendicular with the other it will have two traces, one of which will show at the plane, that at which it may be perpendicular, the angle of obliquity it may make with the other; as, for example, in Fig. 3 the vertical trace A E′ shows the angle of obliquity that the oblique plane makes with the horizontal plane, while the horizontal trace, as A F of Fig. 4, being at right angles to the ground line, shows that the oblique plane is perpendicular with the vertical plane of projection.

If a plane be oblique to both planes of projection, then its traces will at either plane of projection be oblique with the ground line. For example, we may take the line A B of Fig. 3 to be the horizontal trace and at the same time retain the line A E as the vertical trace of the plane. Then the true inclination which the oblique plane makes with the planes of projection is not shown at either plane. The method by means of which the true angle may be found is shown in Fig. 6. We have in Fig. 5 shown an oblique projection of the solid of the prism cut by the oblique plane; letters of reference correspond to those at the corresponding points of Fig. 6.

To find the true angle which an oblique plane makes with either plane of projection: In Fig. 6 let A D represent the ground line, and A B and A C respectively represent the traces at the planes of projection. To find the true angle which the plane makes with the horizontal plane, square with A D draw D B, then square with A C through D draw D C; the lines just drawn are the traces of an auxiliary vertical plane. It is perpendicular to the horizontal plane and also to the oblique plane; it intersects these planes in lines perpendicular to their common intersection at the same point. The angle included between these lines is equal to the angle contained by the planes. To prove this by practical construction, make the drawing upon cardboard, then square with C D through D, draw D E; with D as center and D B as radius, describe an arc in E; draw E C; the angle thus obtained in D C E is that which the oblique plane makes with the horizontal plane. To complete the model we must find the section of the oblique plane as given over the plan A C D. To do this produce the line D C indefinitely, set off the length C F equal to that given in C E, draw A F; the angle included in C A F is the true size of the angle included between the traces A C and A B. The drawing

being completed, take a sharp knife and cut through the board at the outline of the drawing; then at the lines A C, A D and C D cut about half through the board; then in the manner explained for the similar operation at Fig. 3 with the lines at the exterior fold the two sides A B D and C D E vertically over the plan; this done, the section A C F may be folded into its proper position at the model, and if the drawing has been correctly made the student will find that it will exactly fit the space and that the edges A F and C F respectively coincide with the corresponding edges of the sides of the model. In this simple manner may be proved that the angle D C E is that made by the oblique plane with the horizontal plane of projection.

In the diagram of Fig. 7 is shown the method by means of which we may find the true angle which the oblique plane makes with the vertical plane of projection. Letters of reference correspond to those given at the corresponding points of Fig. F. To find the angle: Square with A B draw B D; then square with A D through D draw D C; make D E equal with D B, draw E C. The true angle which the plane in question makes with the vertical plane of projection is given in D E C. To find the section of the oblique plane as given over the plan A C D: Produce D B, as shown; then set off B F, equal with C E, draw A F; the section is now given in A B F. Having made the drawing upon Bristol board, the constructions may readily be proved correct by means of a model, which may be constructed in a manner similar to that already explained for the similar operation, Fig. 6. Simple as these problems now appear to be, yet they contain the key to the solution of the most important constructions as required in the science of hand railing. In Fig. 6 is shown the principle which governs the construction of "level ordinates," for on trial any line which may be drawn parallel with A C at the surface of the oblique plane will be found to be "parallel with the horizontal plane." Hence the term "level ordinate." Also by means of the constructions given in Fig. 6 we are enabled to determine the "true inclination of the section plane of the face mold"; for that is really what the angle D C E includes.

In a similar manner, by means of the construction given in Fig. 7, we are enabled to determine the position of a plumb line as given at the joint surfaces of a wreath piece. For all practical purposes we may take the line B D, as the representation of a joint line at the wreath piece, and by means of the model it may readily be proved that the line D E when in its proper position at the model is a "plumb" one, for it is perpendicular to the horizontal plane which contains the plan. From these remarks the student will see the importance of understanding the principles of geometry, as when applied to the solving of practical problems their value is beyond estimation. For all readers are well aware of the great stress which the teachers of hand railing lay upon the problems of finding the position of a level line at the section plane of the face mold, and at that of finding the joint bevels. But when we understand the geometrical principles and know how to apply them to the practical problems the most intricate of these become transformed into very simple ones.

Progress in American Schools in Regard to Health Laws.

FOR the reason that it is interesting at least to see ourselves as others see us and for the descriptions of school house heating and ventilation in leading cities in this country that it contains, a paper read by J. D. Sutcliffe of Manchester, England, before the Institution of Heating and Ventilating Engineers in London is presented herewith. Mr. Sutcliffe recently made a several weeks' tour examining the schools of the Eastern and Central States of this country, and he was given an opportunity to make a comparison with schools visited by him some fourteen years ago. He accordingly styled his paper "Progress of American Schools in Regard to Health Laws from an English Engineer's Point of View." We print it in full, with the exception of portions recounting the rules that are in force in the State of Massachusetts on heating and ventilation and the laws enacted in New York and Pennsylvania, which have already appeared in these columns.

"The progress in the provision for the health of the school children has been most marked and every care is now taken that the heating, ventilation, sanitation and fire appliances are of the most perfect description. In 1891, when five weeks were spent by the writer in examining the schools in the Eastern States from an engineering point of view, the majority were warmed by hot air furnaces fixed in the basement, on what was known as the Smead system. This system has now been almost entirely superseded by steam and hot water heating, combined with fan ventilation. But great credit is due to Mr. Smead for the educational and pioneer work done between 1885 and 1895 in raising the standard of comfort and health in American schools. No other man has done so much for the children, and in 1891 his system was in use in probably 90 per cent. of the schools in the Eastern States. It was never considered suitable for the English climate, as the air was passed over the outside of a furnace, which warmed it to the required temperature, and English engineers considered such air too dry and too liable to have the nature burned out of it. America has evidently come to the same conclusion, and it is seldom one sees the furnace system except in the smallest village schools.

"It will be noticed [referring to the Massachusetts rules] that the temperature is to be maintained 'at 70 degrees F. in any weather.' This is very stringent and in the opinion of most English engineers is far too high. It must not be forgotten, however, that the percentage of humidity in the air is small compared with this country, and most people find that 70 degrees is not more comfortable in America than 60 degrees in England. The question of relative humidity is an important one in fixing the most comfortable temperature, and whereas records kept in American schools last winter show an average humidity of only 26 per cent., the humidity observations taken in the writer's office were never lower than 65 per cent., and the average for the winter months would be about 72 per cent.

"The Chicago schools were not examined on the previous visit in 1891, as it was understood the school buildings were far behind those of the Eastern States. This has now all been altered and Chicago is paying great attention to the equipment of all schools built within its area. On an average 25 new 12-roomed schools are built each year and the Chicago Board of Education employs their own architect for these. In addition they have appointed a special expert in heating, ventilation and sanitation, T. J. Waters, who has charge of this portion of the work and designs all the necessary equipment. He aims at and secures a very high standard of efficiency, and the following description of one of the most recent schools shows the amount of care taken to provide fresh air and comfortable working conditions for the children:

"The school selected is a three-story building, 174 x 124 feet in plan, with 27 rooms in addition to the rooms in the basement. It was designed by the architect to the Board of Education, W. B. Mundie, and erected under his supervision. The heating and ventilation and all matters pertaining to plumbing, gas fitting and sewerage were designed and installed under the direction of Mr. Waters. The three floors are practically identical; there is a longitudinal central corridor with the rooms at either side and a stairway at each end; the classrooms, eight per floor, are practically all of the same size, 27 x 32 feet, and each classroom has a spacious wardrobe through which the group of flues in connection with the heating and ventilation rises for the rooms of that tier. Above the stairway of the main entrance, situated in what is really a mezzanine story, is the office of the principal,

and over this, in the second story, is a library. The three central rooms of this part of the third story, it may be added, are formed by sliding blackboard partitions, which when rolled away form an assembly room with a permanent stage on the opposite side of the corridor.

"Air is distributed throughout the building on the plenum system. It is received by a double outlet fan in the center of the basement and discharged in opposite directions through both tempering and heating coils located immediately beyond, and the individual room supplies are carried from the warm air plenum chamber to the various groups of flues. The fan is run at a speed of 150 revolutions per minute, belt driven from a 9 x 14 inch steam engine, and has a capacity under an assumed air pressure of ¾ ounce of about 25,000 cubic feet from each outlet per minute. Each outlet is provided, however, with a plate so that any desired quantity of the delivery up to 50 per cent. may be cut off. The air is carried from the plenum chamber through the small blast ducts to vertical flues and thence to the room inlets, each room supply being independent. The air is delivered about 6 feet above the floor level, but the area of the opening is such that a considerable reduction of the velocity of the incoming air is effected.

"Among the requirements of the apparatus it is specified that the supply should amount to 1800 cubic feet of air per hour per pupil, assuming an average occupancy of 54 pupils per room. The escape of air from the rooms is in general through side registers at the floor line in the wardrobes, this method provided for warming these rooms as well. The exhaust system is designed to provide for the discharge of about 75 per cent. of the inflow from the fan into the building, the rest of the air escaping through the numerous inevitable points of egress possessed by every building besides the open doors. There are two boilers of the horizontal tubular type, 60 inches in diameter and 18 feet long, containing 48 4-inch tubes and a pressure of 45 pounds is carried.

Comparison of Chicago Steam Heated and Furnace Heated Schools.

"Mr. Waters also gave the writer figures relating to two eight-room schools, each accommodating 320 scholars and which were erected in 1894. One of these was heated by steam heating apparatus and mechanically ventilated by means of fans. The other was heated by warm air from furnaces and ventilated by natural means only. The warming and ventilating plant in the first school originally cost £1000, and in the furnace heated school £640. The total cost of the bituminous coal used in the steam plant (price 10 shillings or $2.45 or $2.50 per ton) amounted to £90 per year while anthracite had to be burned in the furnace plant, costing 26 shillings ($6.25) per ton, and the average cost of fuel was £200 per year. The steam heated building was also less costly to maintain, the repairs to the plant from 1894 to date amounting to only £17, whilst £90 had been spent in the same time on the furnace heaters.

"Although one must admire the thoroughness with which the whole subject of heating, ventilation and sanitation has been studied and the results obtained one cannot altogether agree with the methods that are most in favor. As an example, all the heating surface is placed at one point in the basement. Now they frequently get temperatures of 40 to 45 degrees F. below freezing, and this means that the hot air has to be delivered into the rooms at a temperature of from 150 to 170 degrees F. in order to maintain an average temperature of 70 degrees throughout. It cannot be considered good practice, and doubtless in time the methods will be modified to avoid such high initial temperatures.

New York Schools.

"Turning now to the city of New York, similar stringent rules affecting the comfort, health and safety of school buildings are in force. The city has its own Board of Education and this board has its own architect. It also appoints a chief engineer, who is a trained man and designs all the heating, ventilating, sanitary and fire prevention appliances and sees to their proper application. The Architect's Department under C. B. J. Snyder is now spending over a million and a quarter pounds sterling ($6,050,000) each year in building new schools and in bringing the older schools up to a reasonable degree of effectiveness for their work.

"The writer had the pleasure of inspecting the new High School of Commerce, and there is certainly no school in England, excepting perhaps the Manchester School of Technology, that can compare with it either in beauty of design or in wealth of equipment for the purpose intended. The building is five stories high with basement and has a frontage of 150 feet on Sixty-fifth street and 100 feet on Sixty-sixth street and will accommodate 1630 students.

"The basement contains a fine restaurant, where food is supplied at cost price; a swimming bath, 30 x 50 feet; a fine gymnasium with a gallery round, asphalted and banked to serve as a running track, besides the fans, boilers and engines necessary for supplying fresh air, heat, steam, hot water and for driving the elevators. Two elevators run continuously from basement to the fifth story and a class of 40 is taken up or brought down at the same time.

"The steam supply is furnished by four boilers 18 feet long and 4½ feet diameter, while the conveyance of coal to the boilers and the removal of ashes from them is by an overhead trolley track, which saves a great amount of floor space. It was specified that the whole building was to be kept at a temperature of 70 degrees F. in any weather, and the fans are large enough to supply fresh air at the rate of 1800 cubic feet per hour for each pupil in the building. This air is delivered only at a temperature of 68 degrees, the real warming being done by steam heated radiators fixed in each room. The radiators are all controlled automatically, so that if the temperature in any part gets above 70 degrees the nearest radiators are partially closed off, while if it sinks below 70 degrees the steam supply is increased.

"In a crowded city like New York the playground problem is a very serious one. In this country we require a minimum unbuilt or open space for a playground equal to 30 square feet for each child. In New York the architect is pleading for a minimum playground space of at least 5 square feet per child, but in some of the more crowded areas it is almost impossible to get this.

"Considerable precautions are taken to minimize fire risks, and the new schools are all in direct electric communication with the fire stations. All school doors open outward and are fixed with automatic bolts so that it is only necessary to push against them from the inside for them to fly open. The scholars are regularly drilled in fire exercises, and at the High School of Commerce the building can be cleared in less than four minutes.

Boston Schools.

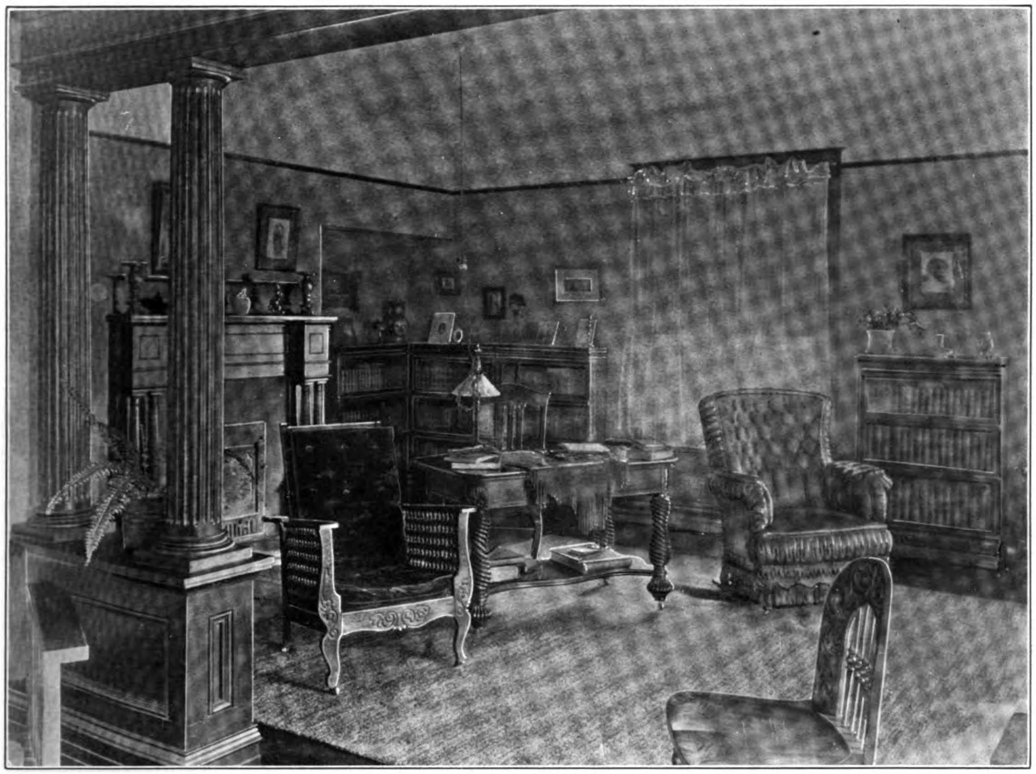
"The writer spent one whole day in examining the new Harvard Medical Schools, Boston, which are fast approaching completion. There are five huge schools in separate blocks and a large power house occupying another block similar in design to the schools. Each block is three stories high, and some idea of the equipment may be gathered from the fact that ten fans each 15 feet diameter are used for supplying fresh air to the various rooms, and 32 fans 7 feet diameter for exhausting the foul air. The heating of the building is on what is known as the forced hot water system—that is, water is heated by exhaust or live steam and then forced through the pipes and radiators, completing the circuit back again to the heaters. The circulation in the pipes is so rapid that in sending the water round a circuit of two and a half miles it only drops about 7 degrees F. in temperature. Some idea may be gathered of the enormous size of these buildings when I say that 104,000 square feet of heating surface is used for warming the buildings.

"The filtering of the air has received considerable attention and each fan has its own air supply and its own filter. The filter for each fan consists of 200 bags or sacks 6 feet long and 10 inches in diameter. Fresh air enters at the front of the bag and must of course pass through the fine canvas bag before it can reach the fan."

FRAME RESIDENCE OF MRS. AGNES H. GRAY AT ELLENSBURG, WASHINGTON.

EDWIN A. WILLIAMS, Architect.

SUPPLEMENT CARPENTRY AND BUILDING, MARCH, 1906.



INTERIOR VIEWS IN RESIDENCE OF MRS. AGNES H. GRAY, ELLENSBURG, WASHINGTON.

EDWIN A. WILLIAMS, ARCHITECT.

SUPPLEMENT CARPENTRY AND BUILDING, MARCH, 1906.

A REINFORCED CONCRETE BUILDING

By Walter S. Timmis.

Among the various forms of construction available for factory purposes are the mill construction, modified mill construction, steel construction with concrete floors, steel construction with terra cotta arches, and reinforced concrete. The first two of these may be classed as "slow burning," or "mill construction," and the last three as "fire proof construction." The mill construction has been used very largely for many years, both in cities and in the country, for the reason that its cost was much lower than any form of steel construction.

Owing to the need of more rigid construction for factory purposes, together with fire protection of a better quality than is afforded by the mill construction, various forms of steel construction have been adopted and used in connection with a large variety of brick and terra cotta arches between the floor beams and with various combinations of reinforced concrete construction to span between the floor beams, the main weight, however, being carried on a steel frame work. With the introduction of reinforced concrete construction, which utilizes a comparatively small amount of steel, it has been found possible to construct absolutely fire proof and rigid factory buildings at a rate very slightly in excess of the cheap form of mill construction which till recently has been used so largely. It is a mistake to think that the introduction of reinforced concrete will mean a decreased use of steel for building purposes, as the type of construction principally superseded will be the mill type, which uses little or no steel.

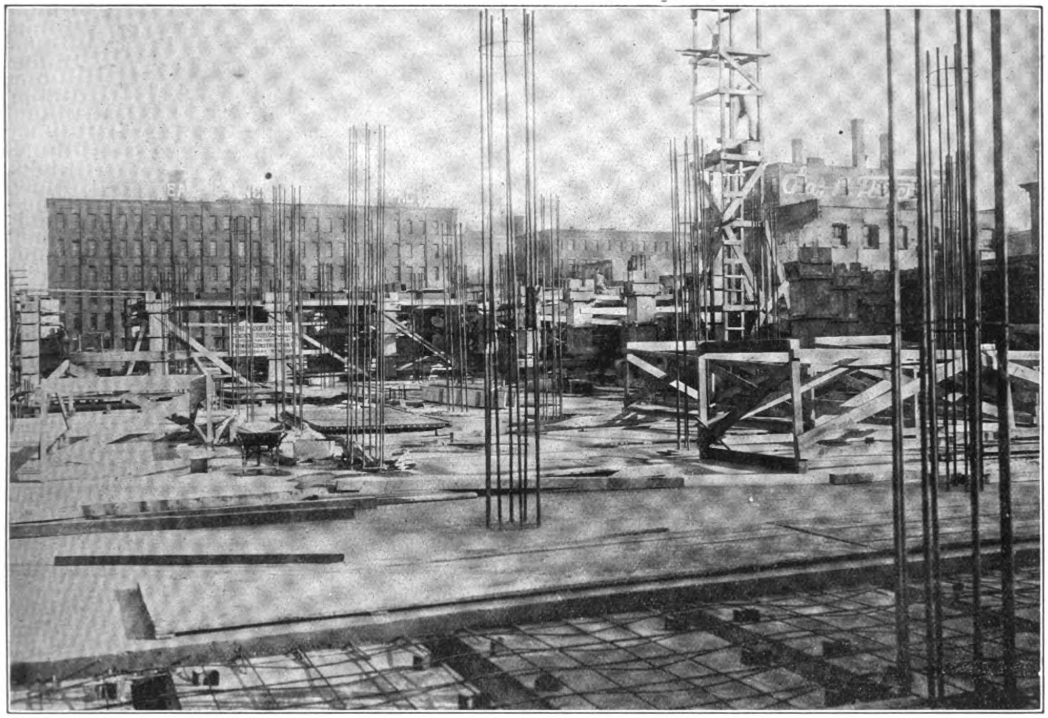


Fig. 1.—The Second Floor During Construction, Showing the Round Rods for Reinforcing the Columns.

A Reinforced Concrete Building.

Modern manufacturing buildings in the smaller towns can be built complete either of "mill construction" or of "modified mill construction" for from 70 cents to $1 per square foot of floor area, depending on the location and the size of building, while modern fire proof buildings of steel and terra cotta fire proofing such as are erected in the larger cities will cost from $2 to $3 per square foot. Buildings of the new reinforced concrete construction can be built in cities for about $1.20 to $1.30 per square foot of floor area.

Taking an average hight of ceiling to be 11 feet, then the costs of various constructions per cubic foot, including excavations and roof, will be as follows:

Average Cost Per Cubic Foot of Manufacturing Buildings.

Style of building.	Location.	Price per cubic foot. Cents.
Mill construction	Large cities.	8½
Mill construction	Country.	6
Fire proofed steel and terra cotta	Cities.	20 to 25
Fire proofed steel and concrete floor	Cities.	15 to 18
Reinforced concrete	Cities.	9 to 10

The above figures are based upon buildings costing from $75,000 to $100,000, but of course there will be variations from these figures, depending on shape of plot and general internal arrangement of columns and other obstructions.

While concrete as a building material has been used for a long period of time, the method of utilizing concrete reinforced by steel has a comparatively recent origin. The use of concrete with steel bars or wire dates back some 30 years. Originating in France, this early work has grown gradually up to the successful combination of the two materials into a standard form of building construction. Probably the first work done in the country was in the early eighties by Ernest L. Ransome in California. One of the first examples in this section of the country was the large factory of the Pacific Coast Borax Company, erected in Bayonne, N. J., in 1898. From this time the use of reinforced concrete has grown very rapidly in many classes of work. There is an example of a very tall building in Cincinnati, 15 stories high, which was built in 1903. The new Naval Academy in Annapolis is of reinforced concrete; the new Military Academy to be built at West Point will be of the same construction. Examples of this work can be

seen in the plants of the United States Shoe Machinery Company at Beverly, Mass.; the Foster-Armstrong Works at Rochester, N. Y.: the Robert Gair Building in Brooklyn, which is of recent construction, and many others in New York City and in various parts of the country.

Many tests have been made both here and in Europe to develop reliable data for determining the stress in the combined materials due to the effect of the live loads and the action of fire, water and weather. It is found that concrete weathers as well as most building stone and it is said that it improves in strength and hardness with age.

There is probably no construction which gives greater rigidity for the same cost than reinforced concrete. The American Book Company of Cincinnati, which is running its printing plant in an eight-story building of this construction, states that there is practically no vibration in the building. The printing room contains 21,000 square feet of floor space, in which 25 printing presses are running, most of them weighing 13 tons each, while there is ample space for additional machinery. According to the company's statement, "there is practically no perceptible virbration when standing by the press and no perceptible vibration whatever in the columns or walls. The building is in this respect superior to our expectations, and we have no hesitancy in saying that a building properly constructed of concrete is an ideal one for machinery in motion."

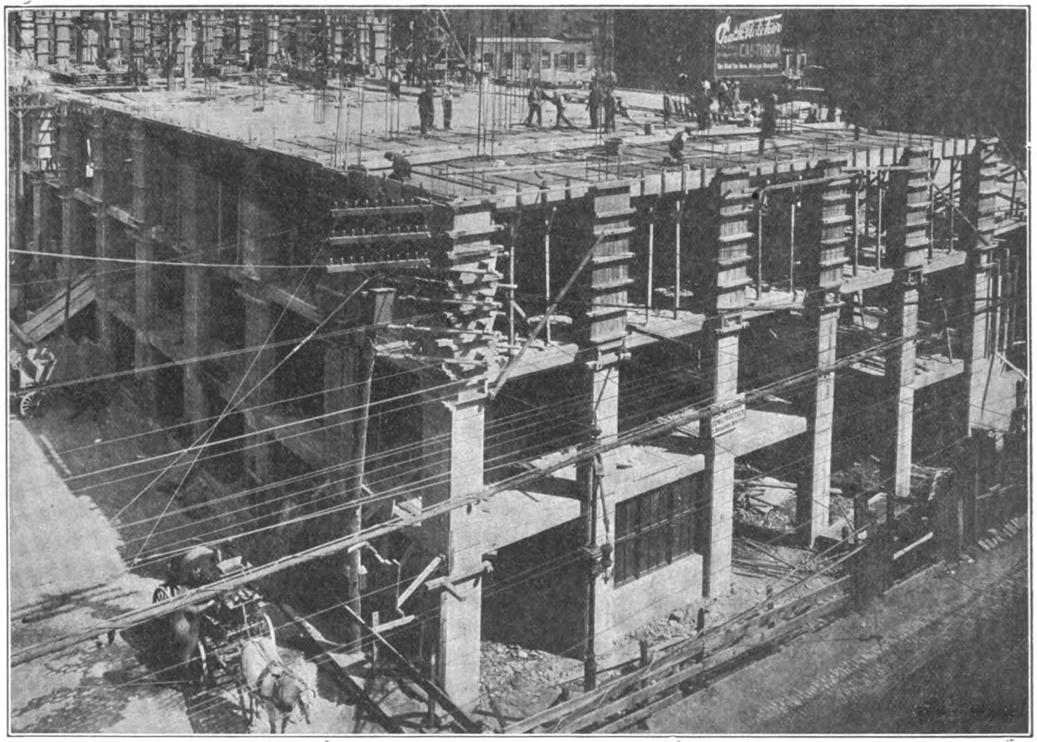


Fig. 2.—The Building Completed Up to the Fourth Floor and Forms Erected for the Fifth Floor Columns.

A Reinforced Concrete Building.

The Ketterlinus Lithograph Mfg. Company, Philadelphia, has built an eight-story reinforced concrete building which is giving entire satisfaction.

To-day a building material, to be acceptable, must also pass a test of the combined action of fire and water. The Department of Buildings of New York City has conducted a large number of tests of various building materials; some of these tests in recent years have been directed by Prof. Ira H. Woolson of Columbia University for the department. In one of his reports he states as follows:

"The fact that concrete can withstand such very severe tests is sufficient proof that it may conservatively be adapted for factory buildings. The heat undoubtedly drives off some of the water of crystallization, thereby reducing the strength of concrete on the face of the part attacked by the heat; this loss of strength is very slow and gradual. A heat of 1700 degrees F. maintained for four hours will not penetrate the surface more than 1 inch. It is not reasonable to expect any such long duration of heat under service conditions. It is also interesting to know that the concrete will again take up this water of crystallization and regain very largely its lost strength."

The fire in the Bayonne plant of the Pacific Coast Borax Company, which occurred in 1903, did not damage the concrete construction more than $1,000. The building, which was 200 x 250 feet, consisted of four stories and a rear portion one story high. The foundations, walls, floors and columns were built of concrete and cold twisted steel, but the roof and posts supporting it were constructed of wood. The building contained a large quantity of wooden partitions and framing for shafting, machinery, bins and stairways. The fire originated in the one-story part and burned through the wooden roof and partitions separating it from the four-story portion, and then swept up through the elevator shaft and stair wells to the fourth story. The roof was completely destroyed. A steel dust collector, weighing about 30 tons, supported on the roof fell 14 feet to the fourth floor below without serious injury to the floor. A few of the floor beams subjected to the shock were slightly cracked, but were otherwise uninjured. With the exception of the cracking of a few beams on the fourth floor, the punching of one hole in the floor slab, some scaling off of the plaster and whitewash, the entire concrete portion of the building was structurally uninjured by the fire.

The Baltimore fire also demonstrated very clearly the superiority of reinforced concrete for fire proof construction.

With reference to the costs it is impossible to give definite figures or to give comparisons that will apply to all localities. In New York and Brooklyn six-story factories of reinforced concrete will not exceed the cost of

mill buildings of brick and yellow pine by more than 5 to 10 per cent., and under some conditions not as much as 5 per cent. Reinforced concrete construction has the added advantage that the hight of the building is not limited to six stories by the building laws and the owner can erect a larger building on his property and thereby obtain a more profitable investment.

In concrete buildings the construction is of equal if not greater importance than design and all work should be done under experienced and competent supervision. The cement, sand and stone should all be carefully inspected and proportioned to give the best concrete. The cement should be mechanically mixed, the steel should be secured in position before concreting, and tests made regularly on the cement by means of cubes made from each day's work and load tests made on floors. Under proper supervision large factories and mill buildings can be constructed of reinforced concrete which will be superior in many respects to the old style brick and timber construction and probably equal in every respect to the best buildings that can be built of brick, steel and terra cotta.

In the accompanying illustrations we show one of the most recent examples of a successful reinforced concrete building. It is eight stories high, 100 x 200 feet, and was built for the Robert Gair Company of Brooklyn, the work being performed by the Turner Construction Company, New York. An unusual amount of window surface is provided, it being, in fact, more than 50 per cent. of the wall space. Fig. 1 represents the second floor during construction, showing round rods for reinforcing the columns. Fig. 2 shows the building completed to the fourth floor and forms erected for the fifth floor columns. Fig. 3 gives a detail of floor construction with forms in place. The finish on the columns, girders and beams consisted of one coat of cold water paint applied with a brush.

The footings were made 12 feet square, reinforced with twisted steel rods, the pressure in the footings being estimated at 2 tons per square foot when all floors are fully loaded. The exterior footings under the walls consist of continuous girders made up of reinforced concrete. The columns are spaced 16 x 16 feet 4 inches and the beams are spaced 5 feet 4 inches, there being three beams to a bay. The floor slab is 4½ inches thick, which includes ¾ inch of Portland cement mortar containing equal parts, ½ of cement and sand, troweled to a hard finish surface. All concrete for floors was mixed in the following proportion: One part cement, 3 parts sand and 5 parts trap rock, passed through a ¾-inch screen.

The floors were designed for a live load of 200 pounds per square foot, and load tests were made up to 600 pounds per square foot, which showed that the maximum deflection of the girders under these conditions did not exceed 3-32 inch, and the deflection of the beams did not exceed ¼ inch during these tests; no signs of injury to the concrete were observable.

The interior columns, which are square with rounded corners, are reinforced with vertical rods running through two stories, and connections are made 12 inches or more above the floor line. The ends of these rods are threaded and connected with nuts, which has the effect of making the vertical steel members continuous. The concrete for all the interior columns consists of 1 part Portland cement, 1 part sand and 3 parts trap rock.

The building has been provided with three stairs, which are inclosed in fire proof partitions, the stairs being constructed of reinforced concrete, the finish of the risers and threads being similar to the finish of the floor in the building. The partition walls, which inclose the stair and elevator wells, are constructed of 4-inch concrete reinforced with vertical and horizontal steel rods.

The building is provided throughout with a sprinkler system, and is constructed and equipped in this respect to meet the requirements of the Associated Factory Mutual Companies of Boston, which of course gives the owner an exceedingly low rate of insurance.

Insurance rates on manufacturing plants in cities are generally very high, owing to the lack of facilities for fighting the fire within the building; also to the character of the construction of many manufacturing buildings. Wherever possible it is advisable to install a fire fighting system, which will be complete in itself. Such a system is embodied in the requirements of the Associated Factory Mutual Companies of Boston, and consists primarily in a reservoir supply of water, a steam pump of sufficient capacity to empty the reservoir in about one hour, a system of tanks located about 20 feet above the highest point of the roof and a sprinkler system fed from these sources of supply.

With a system of this character installed in a reinforced concrete building which is not unduly exposed to contiguous fire risks there should be no difficulty in obtaining an insurance rate which would cost not more than 15 cents per $100. One of the chief advantages of reinforced concrete over the mill construction for factory buildings lies in the lessened amount of damage due to water, which will always run through the floors of a mill constructed building during a fire, when either the city fire department is operating or when the sprinklers have become effective. In a recent fire which occurred in a reinforced concrete building the damage was confined to that section of the floor in which the fire originated. The water used in putting out the fire only passed down the stairways and elevator shafts, none of it finding its way to any of the floors below.

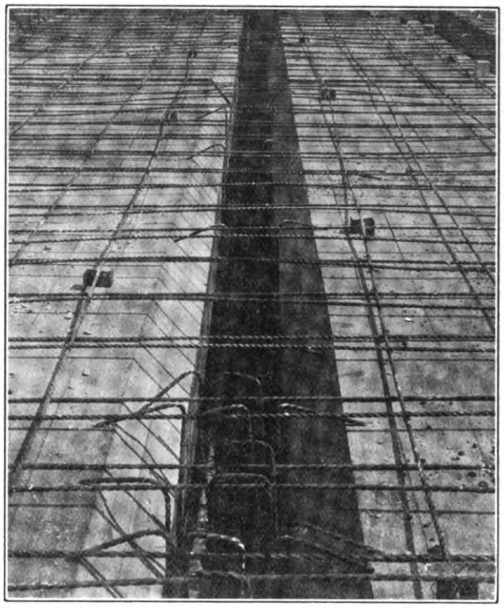


Fig. 3.—Detail of Floor Construction, with Wooden Forms and Reinforcing in Place.

A Reinforced Concrete Building.

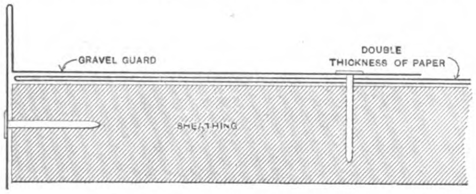
New German Floor Construction.

A new method of floor construction has recently been adopted in Germany which is said to consist essentially of wood pulp. A rough board floor is first laid, which merely serves as a foundation for the flooring proper, and over this the pulp is spread after having been mixed with certain substances which cause it when dry to become almost as hard as stone. It is said to dry with an even surface and can then be painted or stained so as to imitate any wood. It is understood to have many advantages over the old-time use of boards and has been used in Germany in some of the better grade of houses as well as in the cheaper apartments where the item of cost is a factor. Another point about this flooring is that it is impervious to water, grease and dirt and may easily be cleaned.

CORRESPONDENCE.

Laying Tar and Gravel Roofs.

From H. Ayers, *Rondout, N. Y.*—I note the inquiry of "F. C.," Van Buren, Maine, in an issue some time since, and also the instructions given for laying a tar and gravel roof. I do not know whether they are practical or not, but they seem rather too much on the "receipt book" order, and read as though gotten up by some professor rather than by a practical man. Having handled contracts for hundreds of squares of gravel roof in the past few years, and having figured on thousands of squares from specifications prepared by dozens of architects and by several large concerns that make a specialty of this kind of work, I beg to state that these specifications are simpler than those given in the article referred to, and as they are all nearly identical the natural supposition is that they must represent the best method at present known to practical mechanics in this business.



Laying Tar and Gravel Roofs.

To begin with the sheathing, I would say it can be laid with the pitch of the roof, or diagonally, or parallel with the eaves, for it makes absolutely no difference which way it is laid so long as it is of even thickness and the joints are closed. I never saw a roof swabbed over with Portland cement, although there may be some advantage in doing this. However, "F. C." evidently wants to know how to lay a gravel roof practically at as low a cost as possible. If he puts on all the gravel he can it will cost as much as an old style tin roof, and as I have never been lucky enough to find any one who would be willing to pay as much for a gravel roof as for an old style tin roof I will endeavor to tell him how to lay the roof in a practical and economical manner, due consideration being given to its durability.

The roof will probably be a three-ply, four-ply or five-ply one. In this connection "ply" means "thickness"—three-ply means three thicknesses of the paper four-ply means four thicknesses, and so forth. The paper, or tarred felt, comes in rolls. This paper is usually 3 feet wide and a roll contains either 108, 216 or 324 square feet. This lays one, two or three squares of finished roof one-ply or one square of three-ply roof. This paper is generally sold by the ton, although it is sometimes sold by the roll. It weighs about 14 pounds per 100 square feet and sells at about $35 or $36 a ton, f.o.b. New York.

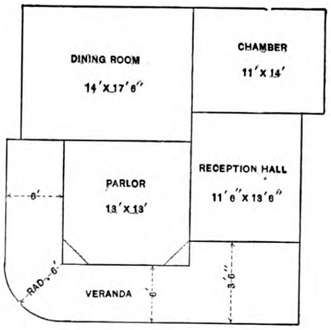
At the eave of the roof should be nailed a gravel guard of galvanized iron or copper, made as shown in the accompanying sketch. Before it is put on one course of paper should be rolled out parallel with the gutter, doubled over, and this double thickness laid on the sheathing with the edge flush with the outer edge of the sheathing. The gravel guard is then put on as shown, and the upper edge carried about 4 inches over the paper and nailed 3 or 4 inches apart. The outer edge is nailed also to the edge of the sheathing to hold it down.

We are now ready to commence laying the roof, and the preparations up to this point are the same for a three-ply, four-ply or five-ply roof, but differ somewhat from this point on. If a three-ply roof is wanted the roofer rolls out a strip parallel with the eave of the roof and stretches it along with the lower edge just touching the ¾-inch projection above the roof on the gravel guard. On top this, 12 inches higher up, the roofer should roll out another course of paper, and then as many succeeding courses as may be required to cover the roof, each course covering 24 inches of the preceding one and leaving 12 inches showing to the weather. At the top end sufficient is put on to insure that three thicknesses of paper is over all the sheathing boards. As each course is rolled out it is nailed along the top edge with 1-inch barbed roofing nails driven through flat tin caps, these nails and caps being about 12 inches apart.

In the meantime the pitch has been heated in a kettle over the fire and mops made of mop yarn tied to handles like broom handles. The pitch is drawn up onto the roof, as needed, in five-gallon buckets. One man now starts along the edge of the roof and turns back the paper and holds it while another dips a mop in the hot pitch and runs it along on top of the gravel guard and the double course of paper under the same, the object being to give a liberal coat of tar, so that the metal will be firmly cemented to the paper under it and there will still be enough pitch to thoroughly cement the first course of paper when it is released. If the courses are very long the man holding the paper will soon get the knack of letting the paper fall over on the hot pitch so that it will lie down smooth. Each succeeding course is turned back in the same way and the course next below is mopped for a distance of about 12 inches up under the course just turned back.

After this is done the roof is usually covered with a thick coating of pitch poured out of a long handled dipper and deftly spread over the surface, care being taken to see that it is spread over every inch of the surface of the roof.

While this is being done another man is busily pushing gravel or slag into the pitch just spread, before it has a chance to cool. This gravel or slag should be dry and if the weather is cool it should be heated so that it will bed in the pitch before the same cools. If gravel is used it should be screened, and nothing used that will not pass through a ⅝-inch mesh and nothing that will pass through a smaller than ¼-inch mesh. The whiter and cleaner the gravel the cooler the roof will be and the better it will look. Gravel is generally used, but slag is sometimes substituted, although it is generally not considered so desirable by roofers and is not so easily manipulated. The roof is now gone over with a broom and swept lightly so that not too much loose gravel is left on it.



Roof Plan Wanted.

To flash around chimneys, walls, &c., copper is generally used. The roof should be laid and the flashing put down on top of the same, running up on the wall to the hight desired and turning out on the roof 4 inches and nailed 3 inches apart. It is then thoroughly mopped over and a double thickness of paper laid over it. Especial care should be taken at these points particularly to see that the laps, &c., are all thoroughly cemented with the pitch.

A four-ply roof is laid the same as above, except that the paper laps 27 inches instead of 24 inches on each course next below, and each course shows 9 inches instead of 12 inches to the weather. It can readily be seen that this insures four thicknesses of paper at every point on the roof, thus the term four-ply.

A five-ply roof can be laid the same way, showing 7

inches to the weather and lapping 29 inches, or it can be laid like a three-ply roof, mopped over and then a two-ply roof put on. This is the general practice and is the better method. When a five-ply roof is laid in this way the gravel guard is not put down until the three-ply is laid and mopped over. This mopping over is done by spreading the hot pitch all over the surface of the roof with a mop instead of pouring it on with a dipper, as explained above, when gravel is to be shoved into it.

The gravel guard is now put on on top of the three-ply paper and any flashing needed is put on and nailed and well mopped with hot tar. Then a course of paper is rolled out at the eave of the roof and 12 inches doubled under it, another course rolled out on top of it 12 inches higher up the roof, and then succeeding courses are rolled out 18 inches higher up, each course lapping 18 inches over the one below and showing 18 inches to the weather. This is mopped along the edges, as described for the three-ply roof, the pitch spread on and the gravel pushed in as described. When this is properly done by men who understand the business a first-class roof is obtained at a minimum cost.

In this section of the country thousands of acres of these roofs are put on annually and they make much better roofs than the writer likes to admit. The price around New York and Philadelphia for a five-ply roof put on complete and guaranteed for ten years by a thoroughly responsible and competent company is from $4.50 to $6 per square, exclusive of flashing and metal work. This is for a roof on which coal tar pitch is used. If a more durable roof is desired asphalt should be used instead of the straight run American coal tar pitch, as it is more elastic and less likely to get brittle with age and cold weather. The use of asphalt adds about 50 cents per square to the cost of the job. Prices mentioned herein apply to large jobs and to localities where it is easy to obtain estimates from contractors in the vicinity.

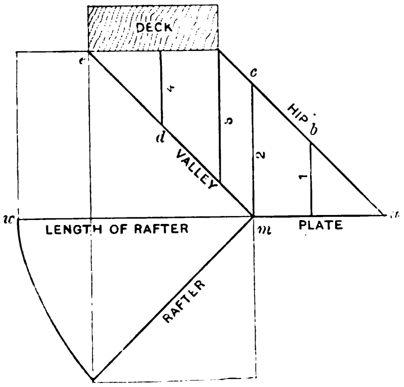


Fig. 1.—Method of Obtaining the Lengths from Plan Lines.

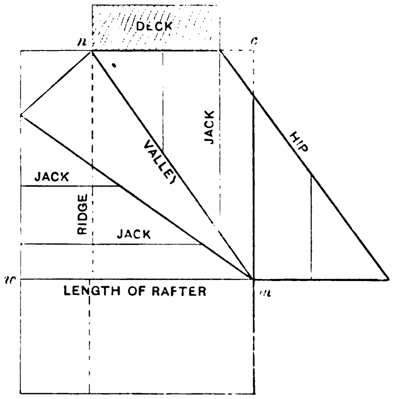


Fig. 2.—Illustrating Method Applicable to Any Pitch of Roof.

Finding Lengths and Bevels of Jack Rafters for a Deck Roof.

If "F. C." has had no experience in this line the job will probably cost him as much as an old style tin roof would. But even then it has the advantage of not requiring painting every few years. It might be well for him to suggest Ruberoid for the roof. This is a very fine grade of prepared roofing, elastic, easily applied and durable.

Roof Plan Wanted.

From A. S. W., *Belmont, W. Va.*—In inclose herewith outline drawing representing the floor plan of a small house for which I desire some of my brother chips to furnish a design for the roof. I might mention that the second story has all square corners, while the corners of the parlor on first floor are cut off as indicated by the dotted lines on the plan. There is a veranda running across the front of the building and around the side. Some time ago I presented a request for a roof plan and there were presented a number in the correspondence columns, one of which I used on the house in question, and for which I wish to thank all the brothers for their kindness and help.

Finding Lengths and Bevels of Jack Rafters for a Deck Roof.

From MORRIS WILLIAMS, *Scranton, Pa.*—In the December issue of the paper "J. A. K.," Detroit, Mich., asked for information respecting the lengths and bevels of jack rafters placed as shown in the accompanying diagrams between a valley and a hip. In Fig. 1 is shown how in a roof of one-half pitch the lengths may be obtained from the plan lines, the jacks being shown at 1, 2, 3 and 4. Jack 1 extends fro mthe plate to the hip, so by measuring along the hip from *a* to *b* will give the length of the jack in question. Jack 2 extends from *m* to *c*, and is determined by measuring from *a* to *c* along the hip. Jack 3 will be the same length as jack 2, as will all other jacks that may be placed between the hip and the valley. Jack 4 is shown to extend from the valley to the deck plate and its length is determined by measuring along the valley from *d* to *e*, as shown.

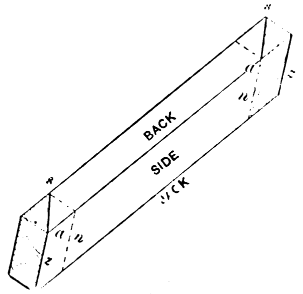


Fig. 3.—Simple Way of Obtaining Top Bevel for Jacks in Roof of Equal Pitch.

Another simple method of finding the lengths of jacks in roofs of one-half pitch is to add 5 inches to each half of the plan lines. For example, we will assume that the plan line of jack 1 measures 4 feet. Now adding to this length 5 inches, 4 times which equals 20 inches, will determine the length of the jack to be 5 feet 8 inches. The length of all other jacks may be found in the same way.

The method shown in Fig 2 is applicable to any pitch. The principle illustrated is to construct the slope of the roof into the horizontal plane. The distance from the plate at *m* to the deck at *c* equals the length of the rafter on one side of the roof, while the distance from *m* to *w* equals the length of the rafter on the other side. By drawing a figure like this to a scale of one inch to the foot the length of all timbers in the roof may be found.

The most simple way to find the top bevel for jacks in roof of equal pitch is shown in Fig. 3. At *z* and *z* is

shown the plumb cut of the rafter. Draw a line as at *n* a distance from *z* equal to the thickness of the rafter. Square over the back as shown and draw the diagonal line *a-s*. Saw off through this line the shaded portions indicated in the diagram. This method will also give the cut to fit the hip and valley against the deck plate.

The plumb and half cuts for jacks are always the same as those of the common rafter. If 12 and 12 will cut the common rafter the same will cut the jacks.

Weather Boarding a Circular Tower.

From O. M. T., *Ocean City, N. J.*—The correspondence columns of this periodical are very helpful to its many subscribers, as well as myself, and I notice that when any one asks for information there is plenty forthcoming. It is encouraging to the craft to see the large number who are seeking information in this manner. But unless they are very careful they will be misinformed, as it must be very difficult for the learner to distinguish the correct answer from the varied replies to his questions. It seems to me that these answers should be censored in some manner, so that when they appear in these columns they will either be corrected or followed by a note explaining that they are wrong, and why. For instance: The answer of "E. F. C.," Bremen, Ind., in the February number, while it is given, no doubt, with a desire to help, is radically wrong, and if it had been so noted would have benefited "E. F. C." as well as "R. J. O'B." and others. I do not like to think of my files containing such bad information, for should they be referred to in the future by some young chip they will be very misleading. However, this is only a suggestion, and may be of no practical value, yet I would be pleased to hear what others think of the matter.

A good rule for finding the radius to which siding must be worked to go on a circular tower is: Divide the radius of the tower (in inches) by the thickness of the thickest edge of the siding and multiply by the width of the siding.

I am not sure that our system of estimating would interest "J. E. K.," Greeley, Col., and it would take up too much space here. It varies only in details from that given in the publication to which the editor calls attention.

Circular Porch Work.

From C. A. WAGNER, *Port Jervis, N. Y.*—Some little time ago a correspondent in the West presented a number of inquiries with regard to shingling a round or circular porch roof and whether it is necessary to circle the butts and shave the sides, also with regard to clapboarding a round tower and whether or not the siding and moldings are kerfed. As none of the other readers appear to have improved the opportunity to express their views I offer a few comments which may not be without interest. I would certainly advise the correspondent to shave the sides of all circular shingle work and would suggest at the same time that it is necessary to have different widths of shingles and if the circle is small the correspondent would find it better to circle the butts on wide shingles. As to siding circular work I would say that I have had occasion several times to do jobs of this kind and experienced no difficulty, but was obliged to work out the siding on a circle; that is cut off the lower edges or the outer ends, but just how much I could not say. I could, however, study out a rule for the work, but I find no difficulty in springing a piece of siding around a circle and in that way establish any circle that may occur. My pieces or lengths may be short on a small circle, but on all large ones long lengths may be utilized. I have never done any kerfing on a miter or angle. As to the question of moldings raised by the correspondent I have had good results as I always cut or kerf my moldings on an angle of 45 degrees or a square mitre in a box and apply plenty of thick lead and oil on the cuts. Then I sandpaper my face work and have the painter apply a good coat of paint as soon as possible before any water or dampness has a chance to do its work. When properly done I defy any one to tell at a glance after the second coat is applied whether the molds are kerfed or solid. I always cut through on the lower edge of the mold on an outer circle and on the upper edge on an inner circle, using plenty of small brads for each kerf. I also kerf all facias with my plancier. I always do kerfed work unless solid work is called for and if done with white lead it will always be a credit to the workman, but do not forget the white lead and a taste for a neat job. I would say to the correspondent, kerf all molds unless called for solid, but use lots of paint or thick lead and sandpaper and by all means do not forget to cut the kerfs on an angle of 45 degrees.

As to ceilings and floor mentioned by the correspondent in question I always consider them as though a 45 degree angle and shipslap my joints, running each way as circumstances may permit. My ideas regarding gutters set on top of roofs I will defer until another time.

Laying Hardwood Floors.

From A CONSTANT READER, *Mount Vernon, N. Y.*—I would like to suggest a substitute for Mr. Odell's idea of fastening paper with lath on finished floors—that is, give the paper about 4 inches lap and glue each lap, which gives a better appearance, as well as a better and fully as cheap a job. When everything is in readiness for the painter to polish the floors the paper can be all rolled up at one time, taking whatever dirt there may be in it. This has proven a success in connection with several jobs upon which I have worked.

Sizes of Sash and Sash Rails.

From OLD READER, *Evanston, Wyo.*—As there is a difference in the sizes of sash and sash rails in the various parts of the country, I would like very much indeed to have the readers of *Carpentry and Building* give the size used in their respective localities.

Cause of Creosote in Chimneys.

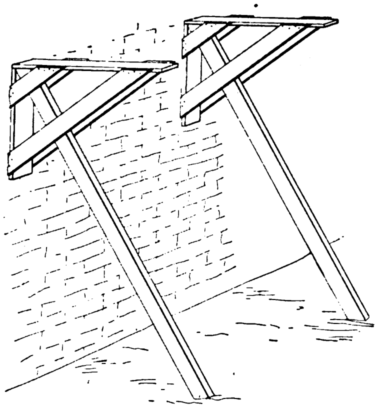
From B. I. H.—In the January number I saw an inquiry for some method to stop the formation of creosote in chimneys and contribute the following as of possible assistance to the inquirer. I had a chimney in my house which bothered me for years and experimented considerably upon it. First I put a 6-foot extension on the chimney, but it did no good. I then put a fan arrangement with no better effect. After trying numerous other devices to get rid of the annoyance I tore the chimney down to a point about 8 or 9 feet below the roof and rebuilt it, putting in a tile lining, and it has worked perfect ever since.

Note.—Our correspondent has given an account of the remedy he applied without explaining the original cause of his trouble or why the desired result was secured with the changes made, and we give for the benefit of those who may be interested the following views expressed by a man who has had wide experience with chimneys and their troubles.

Wherever a chimney is reduced in size it effects a very positive expedient to the draft, often retaining the products of combustion which are passing upward through it to such an extent that they are chilled and the moisture they contain is condensed and comes down in the form of the liquid creosote. Where chimneys are jogged over or corbelled in changing direction the irregularity of the surface on the top side impedes the flow of the gases and on the bottom offers opportunity for the lodgment of fine ashes and soot until the chimney is reduced in area, forming a place which through the restriction of area is conducive to the formation of creosote.

The use of chimney tops on many chimneys is inefficient, largely due to the fact that an abrupt change of size is made where they connect that acts to reduce the speed of the flow of the gases, when often a tapering connection would have caused no trouble. It is quite possible that in the chimney of our correspondent there might have been some reduction in size as it passed through the roof and certainly the attachment of chimney tops, if they reduced the area, would not have helped matters. The fact that he tore the chimney down to a point below the roof and then lined it so as to afford a regular smooth surface of the same area throughout is the explanation of the improved service. It seems strange that though chimneys have been built for ages

men persist at this time in the progress of the world in doing things that have long since been demonstrated as disadvantageous to all who must use what they construct. Much suffering is occasioned by the faulty construction of chimneys, and possibly the health of the occupants of houses with faulty chimneys is sometimes as much undermined by the irritation they cause as by a leaky and unsanitary drain discharging air into the building. Fortunately plumbing inspectors and health officers look after the sanitary conditions, but unfortunately there is no officer, even though large cities have building departments and inspectors, who seems alive to the necessity of compelling the construction of chimneys without faults. It is a matter of congratulation, however, that of late years many chimneys are lined with tile and consequently render far better service than many that were built years ago.



Portable Scaffold Bracket.

A Portable Scaffold Bracket.

From AN OLD CRANK, *Philadelphia, Pa.*—The bracket shown in these columns sometime since is used in the West for portable scaffolding without the iron hook and without cutting the fronts of the building. By using two brackets and putting a pole into the angle of each bracket, with the other ends of the poles on the ground, the scaffold may be used as indicated in the accompanying sketch.

Finding the Capacity of Tapering Tanks.

From E. B. N., *Portsmouth, Va.*—I notice that "T. M.," San Francisco, Cal., gives on page 26 of the January issue an incorrect method of finding the capacity of tapering tanks. The error is so great that it seems desirable to correct it at once, and I therefore submit the following method, which will be found to work out all right:

Add together the square of the radius at the top, the square of the radius at the bottom and the product of the top radius by the bottom radius. Multiply this sum by the hight and by one-third of pi. Pi equals 3.1416, so one-third of pi is 1.0472. If the dimensions are taken in feet the result will be in cubic feet; if in inches, the result will be in cubic inches.

If the quantity is desired in gallons, multiply cubic feet by 1728 and divide the result by 231, or divide cubic inches by 231. Another way is to multiply the cubic feet by 7.48, which equals the number of gallons in 1 cubic foot. Applying this to the example given by "T. M.," we have—

$$\begin{aligned} 3^2 &= 9 \\ 2.5^2 &= 6.25 \\ 3 \times 2.5 &= 7.5 \\ \hline & \quad 22.75 \end{aligned}$$

Now 22.75 multiplied by 7 equals 159.25, and this in turn multiplied by 1.0472 equals 166.7666. Multiplying this by 1728 and dividing by 231 gives 1247.5 gallons as the contents of the tank.

For a cylindrical shaped vessel the cubic contents equals the constant area of cross section multiplied by the hight.

For any symmetrical shaped pyramidal figure the cubic contents equals the area of the base, plus the area of the top, plus the square root of the product of the area of the base by the area of the top, the sum to be multiplied by the hight and divided by 3. The above example might have been worked in this way, but the method used is simpler for cylindrical pyramids.

From C. T. B., *Dubuque, Iowa.*—In the January issue of the paper "T. M.," San Francisco, purports to give a simple rule for finding the contents of a circular tapering tank. The gist of the rule is so obscure and indefinite that I am compelled to contradict his theory, in order that others who may not have a chance to study geometrical measurements will not fall into his error. The geometrical rule for finding the volume of the frustum of a cone is—

$$V = 0.7854\, h \frac{(D^2 + D\ d + d^2)}{3}, \text{ in which}$$

V = the volume.
D = greater diameter.
d = smaller diameter.
h = the hight.

By applying this rule to his problem, in which a tank is 5 feet in diameter at the bottom, 6 feet diameter at the base and 7 feet high, we have—

$$V = 0.7854 \times 7 \times (6^2 + \frac{(6 \times 5) + 5^2).}{3}$$

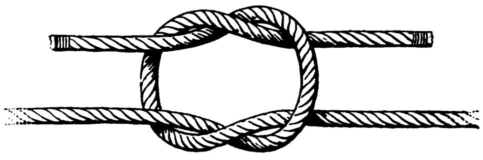
Reducing the equation gives—

$V = 0.7854 \times 7 \times 30^1/_3 = 166.7666$ cubic feet as contents of the tank.

As there are 231 cubic inches in a gallon, a cubic foot contains 7.84 + gallons; multiplying 166.7666 cubic feet by 7.48 gives 1247.41 gallons, which is some 136 gallons more than the correspondent's guesswork figured out.

Scaffold Knots and Hitches.

From HEE H. SEE, *Brockville, Can.*—In the article under the above title appearing on page 71 of the February issue the knot shown in Fig. 5 and classed as "square or reef" is neither one nor the other. Its proper name is "thief knot," and it is the worst knot that can be tied, not even excepting the granny or lubbers' knot, because it will slip further and jam as tight. There is a little story as to why the knot in question is called "thief knot," and at some future time I may have something to say about it. The accompanying sketch shows a true reef knot.



Scaffold Knots and Hitches.

Plans Wanted for "Dog Trot House."

From H. J. W., *Phillipsburg, N. J.*—Will some of the Southern readers of the paper furnish for publication the plans and elevation or methods of building what is known in Southern localities as a "Dog Trot House"? It has two rooms and is built of logs.

Shingling Valleys Without Flashing.

From T. B., *Toronto, Can.*—I would take it as a favor if some of the readers who have had experience in shingling valleys without iron would furnish for publication a few hints, so I may see how it is done.

Hanging Double Sliding Doors.

From OLD READER, *Evanston, Wyo.*—Will some of the readers explain the rule or custom followed in hanging double sliding doors? On which half should the lock be placed, and which half should open first?

WHAT BUILDERS ARE DOING.

It is probably due to the very open winter that building operations are being conducted in practically all parts of the country upon a scale seldom, if ever, approached at this season of the year. Figures from building departments of many cities show an increase for January as compared with the corresponding month last year that is surprising, to say the least. There is here and there a slight falling off, but it is due in large measure to a comparison with the tremendous activity which prevailed in those localities a year ago. All things considered, the volume of operations is unprecedented for this season, and with the stimulus which the movement has already received it is fair to assume that 1906 will not be far, if any, behind the records already established.

Atlanta, Ga.

The very mild weather which has been experienced the present winter served to give a stimulus to building operations, and work has been carried forward upon an unusual scale for this season. During the month of January 240 permits were issued for buildings estimated to cost $299,633, which compare with 189 permits, calling for an outlay of $123,715, in January of last year. These figures show an increase in valuation of over 100 per cent., of which about 33½ per cent. relates to dwellings. Building Inspector Frank A. Pittman is highly gratified with the situation and considers that it augurs well for the rest of the year. The high price of lumber and other building material is apparently having no effect upon the determination of people to put up new houses. Each year Atlanta's building record increases and 1905 gave a splendid account of itself, though it fell a trifle short of the year previous on account of the large number of expensive structures which were erected in 1904.

Bridgeport, Conn.

The Bridgeport Assembly of Master Builders of the Interstate Association held its third annual banquet January 24, covers being laid for about 150 members and guests. One of the features of the occasion was the presentation to President Robert E. Hurley of a gold watch. The menu was unique in its way and was credited to T. B. Beecher, who filled the position of toastmaster. Among the speakers were Mayor Reynolds of Bridgeport, J. A. Emery of New York, President Hurley, C. S. Canfield, A. W. Burritt, W. R. Wilder of New York and others. The work and needs of the organization were touched upon, also the relations of capital and labor and other topics of trade interest.

Buffalo, N. Y.

The annual election of officers of the Builders' Exchange occurred on January 15, the polls being open from 11 in the morning until 2 in the afternoon. The result of the balloting showed the following officers chosen for the ensuing year: President, George J. Hager; vice-president, Henry Schaefer; treasurer, Frank C. Kempf; trustees to serve three years each, William G. Houck, Frank N. Farrar and William B. Ogram. The Arbitration Committee elected consisted of E. M. Hager, John Feist and F. T. Coppins.

The annual meeting of the exchange was held Monday evening, January 22, at which time reports from the various officers were received, these showing that the organization had made gratifying gains during the past year, both numerically and financially. The officers elected were duly installed and after the ceremonies and the business meeting an informal banquet was served in the exchange room. Retiring President Houck was presented with a handsome picture, as a slight token of the appreciation of the members of the exchange for the work so zealously done during the past year.

The amount of building projected in January was valued at $276,150, as against $239,293 in the same month last year.

Chicago, Ill.

Activity in building operations continues in Chicago and January surpassed all corresponding months since 1902. Permits were taken out for the construction of 495 buildings, with a frontage of 14,824 feet and involving a total cost of $2,830,200. In January last year permits were issued for 345 structures, fronting 9498 feet and costing $1,847,700, which gives an increase this year of 150 buildings, 5326 feet of frontage and $982,500 in cost.

The annual meeting and banquet of the Builders' and Traders' Exchange was held January 15 at the Great Northern Hotel, Chicago, when the following officers were elected for the ensuing year: President, J. A. Hogan; vice-president, W. H. Martin; treasurer, E. S. Malone; Board of Directors, J. D. Corbett, Daniel Freeman, John Rawle, H. V. Snyder and A. T. Studt.

Three hundred members attended the banquet. Mayor Edward F. Dunne, who was to have been the guest of honor, was absent, being represented by Frank Childs. Other speakers of the evening were Joseph R. Hansell, John C. Thompson, William D. O'Brien, Oscar A. Reum, William B. Mundie, Edward Kirk, Victor Falkenau, Addison E. Wells and President J. A. Hogan.

A three-year agreement was made February 9 between the Carpenters' and Builders' Association and their men by which wages are advanced from 50 to 55 cents an hour for the first year, with a further increase to 56½ cents an hour for the last two years of the agreement. It is estimated that about 10,000 members of the union are benefited by the increase. The new agreement goes into effect April 1, and the contract stipulates that the men shall not be required to work with nonunion men in their own craft. Sympathetic strikes to assist other unions are prohibited, as has been the case for several years.

It is understood that Lawrence Noyes, president of the Aermotor Company of Chicago, will erect on the North Lake Shore Drive an apartment building intended for occupancy by people of wealth. The novel feature of the structure will be an automobile room on each floor with elevators to carry the machines up and down.

Cleveland, Ohio.

The volume of building operations in January showed a tremendous increase in value as compared with the same month last year, the figures standing $1,700,000 and $266,805, respectively.

The Carpenter Contractors' Association, which has a membership of over 75 of the leading carpenter contractors of the city, has decided to grant an increase of wages of 2½ cents an hour, beginning the first Saturday in April. The announcement came as a surprise, as the members of the association have been operating under the "open shop" plan since last spring and will pursue the same policy the present year.

Columbus, Ohio.

The members of the Builders' and Traders' Exchange took possession the first of the year of their new quarters on the seventh floor of the Brunson Building, at 145 North High street, and on January 3 held "open house" for the fourteenth time. It was a great success and was attended by over 250 people. S. W. Nichol was master of ceremonies and the programme, which was divided into two parts, consisted of addresses, recitations, vocal and instrumental music, readings, &c. Early in the evening there was a reception and a guessing contest, after which followed the entertainment.

Later the newly elected officers for 1906 were announced, as follows: A. M. Magrew, president; J. E. Kuntz, first vice-president; George E. Snyder, second vice-president; R. J. Gardiner, secretary; S. A. Miller, assistant secretary, and E. L. Harris, treasurer. The directors elected were Walter Collins, E. Doddington, R. A. Edgar, J. D. Evans, F. G. Gould, J. D. Hagerty, J. W. Heckart, Charles Klie, D. W. McGrath and D. W. Roberts.

The winners of the guessing contest were also announced and refreshments were served. The Entertainment Committee consisted of S. W. Nichol, chairman; J. D. Hagerty, John M. Rittel, Justus Sandrock, Carl H. Fischer. The Reception Committee was made up of F. H. Howe, chairman; William Watson, E. C. Howard, John Miles and R. L. Watson.

Grand Forks, N. Dak.

The leading builders and contractors of Grand Forks have just completed the organization of a Builders' and Traders' Exchange, with officers elected for the ensuing year as follows: President, Alvin Robertson; first vice-president, William Spriggs; second vice-president, George W. Buckingham; secretary, Louis Campbell; treasurer, C. N. Barnes, and sergeant-at-arms, George Babler. The directors are William Perkins, J. A. Dinnie, C. W. Rickard, C. N. Barnes, Frank L. Dixon, F. T. Roat, M. J. Moran, James Turner, Sr., and Charles Hurd.

Jacksonville, Fla.

The annual meeting of the Builders' Exchange was held in the rooms of the organization at 111 East Bay street on the evening of Monday, January 8, a very large representation being present. The meeting was notable in many ways, and much interest was manifested in the proceedings. An address, which was greatly appreciated by the membership, was that of A. I. Fowler of the Builders' Exchange at Scranton, Pa., who referred to the work which was being done by different exchanges throughout the country. A report was made by the Board of Directors showing what had been accomplished toward the installation of permanent exhibits, the point being made that spaces were being occupied by outside manufacturers of building materials as well as by local dealers.

The address of the evening was that of H. H. Richardson, who was unanimously re-elected president, and which, in fact, was his first annual report of the organization, which

was less than a year old. He traced the efforts which were made early last year to organize the building trades, and which after successive meetings was finally accomplished in May. He reviewed the strike, which was inaugurated on July 29, and called attention to the severe test to which the organization was thus early subjected. The result, however, was the establishment of the "open shop" in the city, he stating that at least 80 per cent. of contract work in the building trades in the city is now "open shop work." He referred to the strength of the membership and to the necessity of still further increasing it so as to include the important concerns in every branch of the industry. He also called attention to the fact that arrangements were about completed for a permanent free exhibition of the best and most up to date building materials. Desk room and spaces for exhibition purposes has already been engaged, and it was expected that architects, prospective builders, contractors, subcontractors and the general public would avail themselves of the opportunity of inspecting the exhibits. A room was also being arranged where plans and specifications could be placed so that those interested could get the information they desired.

Following the annual address of the president occurred the election of officers for the ensuing year, the choice being as follows: President, H. H. Richardson; first vice-president, W. P. Richardson; second vice-president, F. W. Cramer; secretary, John B. Cordero; treasurer, J. W. Ingram.

The Board of Directors elected were: J. H. Kooker, O. P. Woodcock, George R. Foster, John S. Bond, C. E. Hoyle, D. L. Rathbone, Joseph Schreiber, A. A. Kind, Robert McCarrel and David Warrington.

The following standing committees for the ensuing year were also appointed:

Arbitration.—J. C. Halsema, W. S. Kadz, J. H. Kooker, George R. Foster, Jr., and F. W. Cramer.

Architects' Plans and Contracts.—W. T. Cotter, J. H. Boden and H. F. Shore.

Finance.—J. D. Baker, George Hadlow and R. E. La Mance.

Labor.—R. McCarrel, W. P. Richardson and R. Silsbe, Jr.

Legislation.—L. C. Smith, S. A. Marshall and A. H. Kent.

Membership.—O. P. Woodcock, J. K. Munnerlyn, H. H. Jackson, S. Dozier and F. S. Gray.

Printing and Publications.—J. W. Ingram, A. A. Kind and D. L. Rathbone.

Rooms and Rules.—C. E. Wightman, J. S. Bond and J. A. Schreiber.

Immediately following the election the members assembled in the directors' room, and spent a very pleasant hour in a social way. There were informal remarks by various members during which the collation prepared by Jacksonville's noted caterer was by no means neglected.

Memphis, Tenn.

The members of the Builders' Exchange held their seventh annual election February 6. On account of a third ticket having been placed in the field there was much uncertainty as to the outcome, but when the polls were opened and the votes counted the following were shown to have been chosen: President, E. J. Thomas; first vice-president, W. T. Hudson; second vice-president, E. O. Cubbins; treasurer, P. R. Friedel; directors, L. T. Lindsey, E. F. Dowling, A. J. Olson, W. I. Harrison, C. J. Hollis, D. Linehan, E. O. Cubbins, J. W. Williamson, W. A. Terry, I. N. Chambers.

After being elected the new officers made brief remarks appropriate to the occasion. The Exchange is in a most flourishing condition and the officials are expecting a year of substantial development. A large amount of building will be done in Memphis this year and the Builders' Exchange is endeavoring to develop its organization along the right lines.

New York City.

Probably the most interesting item of news in connection with the building situation has been the partial settlement of the housesmiths' strike, which has been in progress for many weeks growing out of a demand for an advance in wages from $4.50 to $5 a day. By means of this settlement the housesmiths have agreed to go to work on the contracts of five employers on a compromise of $4.80 a day. It may be stated that four are independent concerns, and one is a member of the Allied Iron Associations.

Building operations are progressing upon something like a normal scale, but in volume somewhat in excess of this season last year. The same remark holds true of the building operations in the Borough of Brooklyn and in the other sections of Greater New York.

One of the more important building operations for which active preparations have been made will be the erection of 240 or more two-family brick and stone dwellings at Astoria. The buildings will be two stories in hight, and the corner ones will be adapted for stores and flats. The estimated outlay is placed at $1,500,000, and the work will be done by the Crimmins Realty Company, which was recently incorporated.

The second annual dinner of the Master Carpenters' Association of Brooklyn was held in the Assembly on Pierpont street on the evening of January 25, the large dining room being filled with members and their guests. The affair was most enjoyable in every way, and the speakers were followed with the closest interest.

Edward S. Murphy has been appointed Superintendent of the Bureau of Buildings in the Borough of Manhattan to succeed Isaac A. Hopper, who resigned December 21.

Norwich, Conn.

The members of the Master Builders' Association held their annual meeting Monday evening, January 29, at the Buckingham Memorial, a large number being present. Officers for the ensuing year were elected as follows: President, A. N. Carpenter; vice-president, V. S. Stetson; secretary, George E. Fellows, and treasurer, Hugh Blackledge. Various matters of trade interest were discussed, and a committee, consisting of Frank H. Smith, A. M. Brown and Henry G. Peck, was appointed to arrange for a banquet on February 26.

Philadelphia, Pa.

Building operations during January were pushed forward with more vigor than ever before at this season of the year. Weather conditions have been unusually favorable for outdoor work, and a number of large operations have been started. The report of the Bureau of Building Inspection for the month of January shows that 529 permits for 1038 operations, valued at $1,738,320, were taken out, this being an increase in value of $733,515 over the corresponding period last year, and exceeding the record for December, 1905, by nearly $700,000.

From present indications there will be an exceedingly large amount of work, particularly in two-story dwellings, during the coming spring. One operation alone, covering 136 houses of this type, valued at $190,000, was started during the past month, while one of 328, two and three story dwellings, is to be built in the southwest section, and another of 300 is to be erected in the northwest section, for which permits have not yet been taken out.

Building generally is in a very flourishing condition. Labor has been in good demand. Skilled mechanics are well employed, and in some branches of the trade hard to obtain. The outlook for building is very satisfactory, and with the amount of work already in sight the year is expected to be a very busy one.

The Master Builders' Exchange, at its annual meeting on January 23, elected the following directors: F. M. Harris, Jr., John S. Stevens, F. H. Reeves, J. S. Makin, John R. Huhn, William B. Irvine and Cyrus Borgner, to fill vacancies caused by expiration of the terms of seven members of the board, and John N. Gill, to fill the unexpired term of the late Michael Magee.

At this meeting the exchange unanimously indorsed the various projects under consideration by the Board of Education for the establishment of mechanical trade schools in this city. At a later meeting of the Board of Directors of the exchange held February 13, the following officers were elected for the ensuing year: President, Albert A. Reeves; first vice-president, John D. Carlile; second vice-president, Cyrus Borgner; third vice-president, F. M. Harris, Jr.; treasurer, Henry Reeves; secretary, Wm. Harkness, and trustee of the Endowment Fund, Albert A. Reeves; Charles E. Smith was appointed superintendent of the exhibition department and of the exchange building.

The Master Carpenters' and Builders' Association, at its annual meeting in the Builders' Exchange January 24 elected James Johnston, president; Joseph M. Steele, first vice-president; Frank R. Whiteside, second vice-president; Charles A. Wetter, secretary; Thomas H. Marshall, treasurer, and F. R. Whiteside, George Watson, A. H. Reeves, Wm. Nutz, Wm. R. Dougherty, John R. Wiggins, J. Lindsay Little, John O'Donnel and Joseph M. Steele directors for the ensuing year.

Pittsburgh, Pa.

Whether it be due to the very open winter that has been experienced or to other causes the fact remains that building operations have been upon an unusual scale for this season, as the projected improvements for January were valued at $1,419,534. This compares with $389,317 in the same month last year.

The Builders' Exchange League of Pittsburgh formally opened its permanent exhibition of building materials and devices the last week in January with appropriate ceremonies. The "Hall of Exhibit," as it is known, is on the sixth floor of the Heeren Building, where 6000 square feet of space has been allotted for the purpose, and it is occupied by the comprehensive displays of 65 exhibitors representing local and out of town concerns. A competent director will be in charge of the exhibit, which at all times will be free.

Rochester, N. Y.

The January report of the building operations issued from the office of the Fire Marshal showed that permits were issued for buildings, valued at $135,992, which figures compare with $82,885 in January of last year. A noticeable feature of the report for January this year is that for the

first time in a long period not a structure intended for manufacturing or business purposes is included, for many months past manufacturing buildings having swelled the totals of the monthly reports, but that issued for January included nothing but dwellings or flats. If the remaining months of the year maintain the record established by the January figures the total will be a record breaker.

San Francisco. Cal.

The monthly report of the city architect shows that during January 457 permits were issued for buildings, at an estimated cost of $1,070,466. Estimates of the building work actually undertaken during January place the amount at about $1,500,000. Of this amount about half was for frame construction, and half for brick and stone construction. Builders consider that the showing made has been unusually good for January. The outlook still continues very favorable, especially for brick and stone construction. Plans are under way for the erection of a number of large office buildings and for the reconstruction and remodeling of several large buildings which are now considered somewhat antiquated. The building of frame residences is not expected to be quite so active during the early part of the year as was the case a year ago.

The demand for materials and for labor continues good, being in both cases about equal to the supply. Cement, which has heretofore been scarce, is in better supply, owing partly to the arrival of considerable shipments of foreign cement and partly to improved deliveries of the domestic article. There is plenty of common brick to be had at low prices. Builders are inclined to think that the present brick making capacity of the State will lead to a continuance of cheap brick. Stocks of lumber are, in general, rather low in the local yards, but no fear of a lumber famine is entertained.

The Mechanics' Institute has decided to secure plans for a three-story and basement brick building to be erected at the corner of Hayes and Polk streets. The site has a frontage of 186 feet on Hayes street and 52 feet on Polk street. The estimated cost of the building is $65,000, and the walls will be strong enough to admit of erecting two additional stories and extending the building along Hayes street.

John H. Saunders has closed a contract with F. J. Fernhoff for the erection of a four-story and basement frame building at the northeast corner of Larkin and Sacramento streets at a cost of $50,000.

A six-story brick building will be erected by T. C. Wilkens on the west side of Stockton street, 55 feet south of O'Farrel street on a lot 27½ x 82½ feet recently purchased from L. Guggenheim for over $100,000.

St. Paul. Minn.

The comparatively mild winter which has been experienced has tended to turn the attention of architects and contractors much earlier than usual to the prospects of spring building operations and a canvass of the field shows the outlook to be of a most promising character. Indications are that there will be much heavy work, such as warehouses, public buildings and business blocks, and while it is a little early to determine the extent of the building of private houses, it is safe to say that they will come along in goodly numbers, but without the publicity that is given to large structures. It is not likely that many large flats or apartment houses will be erected.

The year which has just closed was a particularly good one for builders, and there were numbers of moderate priced dwellings and business structures ranging in cost from $5000 to $50,000 each. The labor situation was quiet, and there was no serious interference with building operations. A correspondent writing of the situation in the city says: "Agreements are not made with labor organizations in any of the building trades, as we have always believed them to be disadvantageous to the employer. Further, labor organizations will not enter into agreements unless employers agree to employ none but union men. The courts have decided such contracts to be unlawful. They certainly are un-American and do not belong to this land. To my mind the greater part of all our labor troubles would have been avoided if employers had upheld the right of individual contract, regardless of union, creed, nationality, color or anything else. This is a country where the right of the individual is supposed to be sacred, and where individual effort should be rewarded according to ability displayed. Any movement which seeks to bar the individual from any of these rights should have no place among us. The unions are not to blame for all the trouble by any means. Employers are equally responsible with them, for in making these agreements they have for years been sowing and preparing for the harvest of trouble they have been reaping in the larger cities during the past seven or eight years. Whether or not the coming year will be one of trouble in the labor lines is hard to determine. Increase of wages is asked for in some of the trades. Whether or not the increase will be granted I cannot say at this time. Supply and demand have always solved this question, and I think will determine it this year."

The fourth annual banquet of the Builders' Exchange was given at the Merchants' Hotel in St. Paul on the evening of January 18, when over 300 builders of the city and vicinity enjoyed the good things which were provided both in the way of refreshments and patriotic eloquence. The banquet room was profusely decorated with palms, roses and potted plants, and at each plate was a *menu* with a neat cover, the design suggesting some of the more important buildings to be erected the ensuing year. After the things called for by the *menu* had been duly considered, J. F. McGuire, president of the Exchange, greeted the assembled guests and mentioned that of the $7,000,000 spent in buildings in St. Paul last year 90 per cent. passed through the hands of members of the Exchange. Numerically, he stated, the Exchange is the largest business organization in the State. He then introduced J. V. L. Corning as toastmaster, who in turn presented A. B. Stickney, president of the Chicago Great Western Railway, who took for his subject, "St. Paul-Minneapolis as a Market Town."

The toastmaster next introduced Governor Johnson, who spoke on the stand he had taken for publicity in bids for State buildings, pointing out that he had taken the position he occupied not because it would do any particular member of the Exchange any good, but because all public buildings should be open to the public eye. A. H. Lindeke spoke on "Our Auditorium," giving a history of the movement and an outline of the plans. A. K. Pruden had the topic, "The Builders' Exchange as a Unit," and advocated making a membership in the Exchange worth something by excluding those who took contracts which they are not competent to carry out. O. E. Holman spoke on "Our School Facilities," pointing out that since 1891 there had been expended for school buildings $600,000 as compared with $17,000 in a recently similar period. Instrumental music was furnished by the Twin City Orchestra and there were vocal numbers by soloists.

The Exchange has issued to its members and friends in the architectural and building lines throughout the Northwest and Pacific Coast States a neatly arranged "Builders' Reference and Guide Book" for the city of St. Paul. Within its covers are to be found the names of the officers, committees and members of the Builders' Exchange of the city named, together with the business classifications, also the objects and aims of the Exchange. There are interesting facts about St. Paul, a list of the local architects, a statement of the objects and aims of the Minnesota State Association of Builders' Exchanges and lien laws of Northwestern, Western and Pacific Coast States. Scattered through the work, principally occupying the right hand pages, are advertisements of building contractors, dealers in builders' materials and others likely to prove of interest in this connection.

Youngstown, Ohio.

According to the announcement made in the February issue the sixth annual banquet of the Youngstown Builders' Exchange was given in Odd Fellows' Hall, Tuesday evening, January 23, covers being laid for nearly 200 members and guests. For some time rumor had it that the banquet would be a novelty in that set speeches would be dispensed with and some laughable schemes presented for the amusement of the guests. The committee in charge of the entertainment, with T. L. Davis at its head, furnished a programme which was altogether in keeping with the rumors which had been afloat and the affair was most enjoyable. After a substantial *menu* had been duly considered, Charles Sharp introduced E. S. Walton as toastmaster, and although it had been announced that there would be no speeches, Mr. Walton said that he felt compelled to ask Louis Heller of the Heller Brothers Company to say a few words. In response Mr. Heller gave a short talk on "Building."

Notes.

During the month of January 149 permits for buildings, aggregating a value of $305,439, were issued by the building inspector's office at Milwaukee, Wis. During the same month, last year, only 109 permits were issued with a valuation of $48,776.

The year starts out with indications that the volume of building in Lynn, Mass., will exceed that of the past twelve months. There were more permits issued in January for the erection of buildings than in the corresponding month of any previous year. Apartment houses are going up in various sections and in many instances they are rented long before completion.

Present indications point to a spring boom in building in New Rochelle, N. Y., contracts aggregating over $1,000,000, and insuring the construction of scores of houses, having just been concluded, and work will be commenced just as soon as weather permits. In the meantime there is a rush of orders for lumber, iron and mason materials, so that when the season opens materials will be in readiness for pushing the various contracts to completion.

An agreement which will run one year from May 1, 1906, was recently signed by representatives of the carpenters' unions in Paterson, N. J., and a committee of the Master Carpenters' Association. Over 700 carpenters will be affected by the new agreement and the fact that an understanding was reached at the first meeting speaks well for the harmony at present existing between employers and employed in this particular branch of the building industry.

CABINET WORK FOR THE CARPENTER.*

THE DINING ROOM.

By Paul D. Otter.

THE dining table is the central object in the study of the dining room, and just how much attention will be given this piece of furniture will depend upon circumstances, for it is desirable to have a table that is "elastic," accommodating either the slow growth of a family or the sudden dropping in of your wife's brother's family, or mayhap making it under other conditions small and cozy. This feature of pulling apart the main construction or contracting it is usually pretty thoroughly covered by patents and so well made that it probably would not be profitable to make a similar device. If, however, a person is already in possession of a dining table it might be well to remove the expanding and contracting device and apply it to such a table in contemplation. The round top table is now more in evidence than the square top and is no doubt more to be desired by the housewife in the setting and general effect.

In the illustration, Fig. 4, is shown a modern pedestal table, which may be equipped with the usual sliding device under all dining tables. The more massive tables frequently have a small turned or square center leg, which when the table is closed to the minimum size is completely enveloped by the hollow pedestal. The method of constructing this table is sufficiently shown in the illustration to preclude the necessity of any extended comment. The rim under the top is generally steamed and bent to shape, although many makers saw kerf at frequent intervals and over a drum or form glue and clamp on a face veneer ¼ inch thick. When this has been edge surfaced fasten to the glued up top by means of screws at frequent intervals sunk in counterbored holes. On the inside place corner blocks glued at intervals. The two pieces are exact halves of the surface, either 48 or 54 inches in diameter, with the edges treated with a plain mold. The intervening and loose "leaves" are squared to the length of the top diameter and provided on one edge with 7-16-inch pointed dowels projecting ¾ inch. The opposite edge of each leaf is bored with holes corresponding in position to the dowels, each hole having the edge countersunk to permit of the pins readily centering.

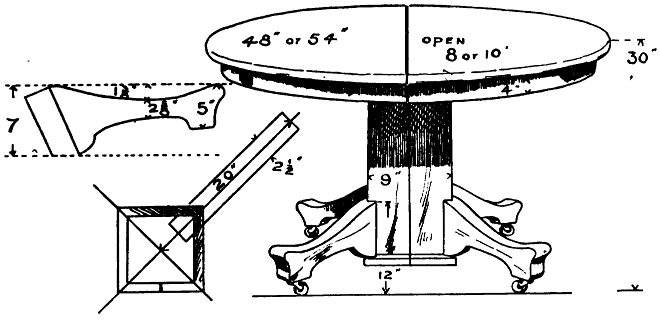
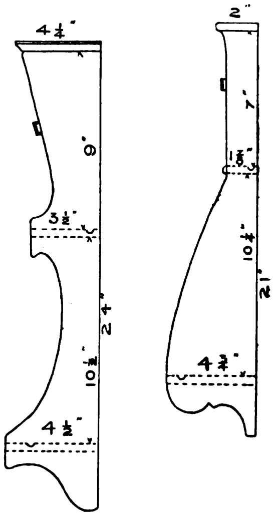


Fig. 4.—Modern Pedestal Dining Room Table.



Figs. 5 and 6.—Suggestive Outlines for Ends of Plate Rack.

Cabinet Work for the Carpenter.—The Dining Room.

The square pedestal is best described by calling for a mitered box 24 inches long by 9 inches square of well figured stock, care being given to place the figure to view. This box should be reinforced on the inside by stout corner strips set in glue. On the lower end lay out to insert by exact fitting the 4 feet of the table at an angle of 45 degrees. On each corner provide the lower edge with a plain suitable mold, then remove the fitted legs and saw the pedestal from end to end in the middle. This had best be done on a rip saw. Now the feet may be glued and inserted in their proper places and fortified by corner blocking, and with screws well directed produce as near as possible the equivalent of a mortise in solid wood.

The Plate Rack.—The hanging plate rack, Fig. 7, until recently has been an expedient of what the permanent wall molding is for the same purpose. Even with this there is a liability of the housewife continuing to acquire more fancy dishes than closet or wall molding will admit and the rack proves to be a desirable adjunct. The two end views shown in Figs. 5 and 6, together with the sizes given, will readily suggest other outlines. Frequently small brackets on the outside are worked in the construction as a lodgment for a particular mug, stein or odd shaped piece. In this, as in all such work, the embodiment of that which is particularly fitting to one's personal requirements puts the work on a different plane. The question will arise among one's friends—your helpless friends, those who do not know how to do things—where did you get it? who made it? what made you think of it? &c. You who are able to wield the tools of the wood trade can easily excite enthusiasm of a substantial character, for it is a time when patrons are easily cultivated if you can offer them something that fits their needs and is given an individual stamp.

Swing Top Table.—The swing top table, or "English breakfast table," is particularly useful in more ways than as a dining room accessory. The writer has found such a table constructed from his drawings most serviceable for writing and the ample surface it gives in laying open many papers makes it more desirable often times than the more restricted writing desk. This table, Fig. 8, proves to be the embodiment of utility and when out of service with the top swung into a vertical position it is just one of the pieces to break the angularity of a room, for with the tripod form of base one foot can be placed to the wall corner and the top shown to the front as a presented shield. This particular top led to a happy thought as to the disposal of a certain rare piece of ash burl veneer of an unusual size, or, more correctly stating the fact, the possession of the veneer required thought as to how best use it in its full surface and the oval table top was the result. The shaft consists of a turning from 3½-inch squared stock. This draw to your own fancy, bearing in mind that a long, smooth, plain part with few finicky dips and knuckles will be most satisfactory. The post stands, with the three feet attached, 27½ inches to the squared top, upon which is secured with four screws a block 1 inch in thickness shaped at the end and the

---

* Continued from December issue.

width of the post, as shown at A of Fig 9. At the straight end of this block is secured by two screws a 1-inch straight round pin, C, which has been previously inserted in corresponding holes in the lengthwise battens, as shown at D. The table top operates on this pin, permitting it to be turned to a vertical position if desired to stand somewhat out of the way. In order to lock it in a level position a turn block of maple secured at B and operated as shown at D securely holds the top against the projection of the immovable block A. To determine the position of the two holes in the battens the top should be set squarely in the middle over the post, when the hole center may be marked and the battens removed for boring.

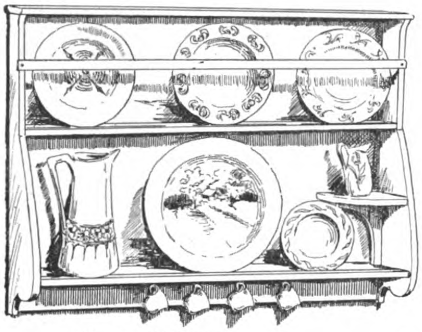


Fig. 7.—Plate Rack.

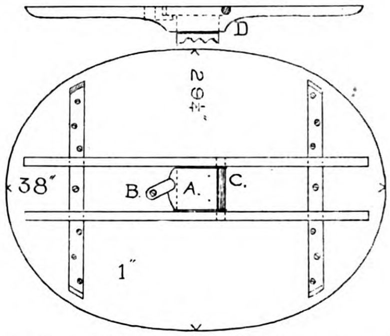


Fig. 9.—Under View of Table Top.—The Part D Represents Side View of Batter Showing Position of Dowel Hinge C and Catch B.

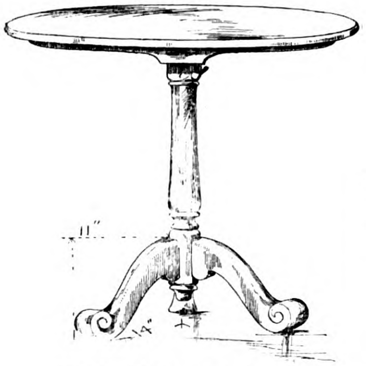


Fig. 8.—Swing Top Table.

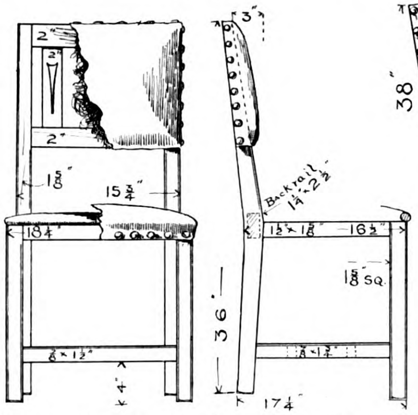


Fig. 10.—Front and Side Views of Dining Chair.

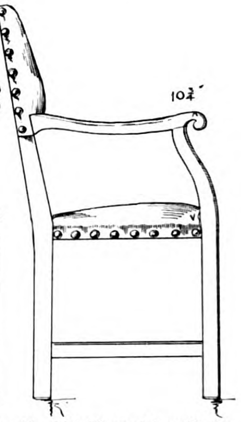


Fig. 11.—Side View of Arm Chair.

Cabinet Work for the Carpenter.—The Dining Room.

Make sure that the stock for the table top is perfectly dry. This should consist of not more than three widths selected to have the joints match well. After gluing reduce to a full inch in thickness and fasten with glue and screws immediately, the two cross battens. Furthermore, if possible put on the first finishing coat in order to doubly guard against any chance of warping while the other work is being carried on. The edge should be treated to a half round mold, an ogee or a part half round with a slight undercove mold.

The Dining Chair.—The pattern shown in Fig. 10 is offered because it is little seen in furniture stores selling at a popular price and is a type more made to order, with specially selected upholstery covers. It is very true in furniture that the solid and substantially plain is expensive. Good reason why if one is able to produce such work that he confine his efforts to that which will always satisfy—the plain and direct in construction.

Two ways of treating the back and seat are indicated, the leather on the back and the heavier padded seat being the more desirable but more expensive treatment. One may choose to make the back with three flat splats, as shown, and the flatter padded seat, and at some future time change the style of the chairs by the more sumptuous overstuffed treatment, as shown. This chair without the upholstery in the back could be fitted with a 1-inch saddle shaped seat if no upholstery is desired. Should the chair be made for an allover covered seat, as shown, the front seat and rear rails may be of some solid inferior wood. Before the final gluing the edges of the legs and back posts and top of strainer rails should be treated to a decided chamfer. Do not fail to reinforce the seat rails by corner blocks firmly fitted, glued and screwed.

One or two arm chairs will be a desirable part of a set of dining chairs. With this particular pattern, and as would apply to most any arm chair, the front should measure 4¼ inches wider and the back 3½ inches wider than the dining chair, and the depth of the seat 2½ inches, with the back post 2 inches higher than the diner. The front leg is extended to the curved front post, as shown in Fig. 11. In laying this out on the drawing aim to combine the arm and post so that the scroll end does not project beyond the face of the post, as it is annoying to have the arm strike the table. The top of the arm joins the back post 11½ inches from the top of the seat rail. The arm is secured from stock 3½ x 18½ x 2 inches in width. Finish the top with a low round dressing. The front and back posts from the seat down should be 1¾ inches square.

Upholstery.—The upholstery admittedly gives tone to such a pattern as shown in Figs. 10 and 11 and this work is not very difficult. Assuming that the back and seat are allover covered, the manner of giving a workmanlike edge to the seat is by fitting and nailing a ⅞-inch dowel on the seat rails, as shown. Mitering the three pieces at the front corners with the slight overhang, as shown in the side view of Fig. 10, gives when covered a desirable effect, as will be understood from an inspection of the front view. On the bottom of the seat rail stretch very tightly

burlap upholstery bands, weaving them from side to side and from front to back so that a solid cover is formed. This is done by heavy tacks, doubling the ends before nailing. Upon this surface evenly space six double upholstery springs and with a curved upholstery needle and twine sew them in this position to the burlap. From the top rail nail down with a staple and knotted end of heavy cord and begin tying down each spring from side to side and front to back. This must be done with an eye to the form of seat—that is, having the outer springs pressed down more than the center ones and maintaining that crowned form peculiar to all chair seats.

First efforts may not prove entirely satisfactory and the work should be cut out and done over in order to secure a well balanced frame work, upon the top of which lay a piece of bagging or burlap cut a little larger than the frame and from the back proceed to tack over the cord work. When fastened along the back railing pull over and tack along the front rail, turning one edge in double, then in like manner the seat and finally tack down the other side. The work should now look balanced and not too highly crowned. Herein a little observation and judgment should be used to decide this part of the work. Upon the top of this covering is placed a generous quantity of well picked hair. Mold this about to the form as much as possible and with the curved upholstery needle secure it by a few well placed stitches so that it will not shift in after use. A sheet of cotton batting is very often used—laid upon the hair—and the work is then ready for the leather covering. Brown Spanish leather should be used for the covering. In order to ascertain the correct size a trial should be made, using some cheap material, stretching and tacking it sufficiently with small tacks, which may easily be afterward removed, and then a paper pattern can be cut for use in securing the leather without waste. The smaller headed nails are proper should the very large nail be found too expensive. Whatever nail is used aim to so place the four or five tacks on each rail that they will be finally hidden by the heads of the finishing nails.

Now start the leather from the back and proceed to place a few starting tacks along the back rail and then finally pull forward, meanwhile pressing with the hand. Pull down over the dowel edge and secure with four or five tacks along the lower edge of the front rail. Then after cutting out a corner of the leather against the back post double and tack neatly about the post and proceed to form down to the side rail. Then secure the other side in a similar manner. Possibly a smart blow with the hand will be necessary to correct any unevenness before the cover is at last held to place. The finishing tacks should now be correctly spaced and driven to place. At the corner a small square should be cut out to avoid an extra lump at that point.

In concluding the subject of furniture pertaining to the sitting room, parlor and dining room the matter of stain and finish has been in previous articles treated in detail. The finish which continues to be popular is the dull finish with which every one no doubt is familiar and which is exemplified in connection with the so-called "mission," "quaint," "arts and crafts" furniture, while the color is under as many more terms—"weathered," "Antwerp," "cathedral," &c. Golden oak, however, which is standard and generally seen under varnish finish, is a most pleasing tone treated with a wax finish, as described in former papers. Such a finish will always be satisfactory and its appearance will be improved every time it is rubbed over with a cloth.

HOLLOW TERRA COTTA FOR COUNTRY BUILDINGS.

By George E. Walsh.

Building laws of our cities demand more or less fire proof construction of houses, so that the use of brick, terra cotta, concrete and steel skeleton frame work have become the chief materials for architects and builders; but in the country frame houses of wood are not only permissible, but the most popular. Nevertheless, owing to the great fire losses and high insurance rates, the tendency to build with fire proof materials is rapidly growing even in the rural districts. This movement limits the use of wood more to the interior trim and for such exterior ornament as piazzas, pergolas and similar features of the modern country home.

The questions of cost and artistic effects have always been potent in deciding the general nature of house construction. Formerly the cost of fire proof construction was so much in excess of wooden frame construction that it had little chance to compete with it, but this difficulty has been largely removed in recent years by the reduction in the cost of fire proof bricks, hollow terra cotta building blocks, concrete building blocks and other structural materials. Lumber has advanced in price in almost direct proportion to the cheapening of fire proof materials. This fact has driven many to consider the value of the new construction materials.

Architects who formerly found it easier to work in wood have demonstrated their ability to design country homes of great beauty and artistic effects with fire proof materials. It is no longer considered impossible to produce a country home of brick, stone and terra cotta in perfect harmony with rural surroundings, and types of this class of houses are multiplying in all parts of the country. The remarkable popularity of hollow concrete building blocks is typical of the new movement. Thousands of country houses are being constructed of concrete blocks, with only such use of wood as deemed necessary to give a perfect finish to the interior and exterior.

The use of hollow terra cotta building blocks is older in our cities than concrete blocks, and most of the large hotels, apartment houses, skyscrapers and public buildings are composed of this material. With iron skeleton frame work to carry the load up to almost any hight desired the work of protecting it inside and outside with porous hollow terra cotta blocks has been simple and effective. A fire originating inside or outside of such a building has little chance of warping the metal or spreading from one room to another.

The adaptation of this form of construction to isolated country homes marks a comparatively new departure. While recognizing the value of fire proof clay for building purposes, architects and builders have met with the obstacle that a good deal of iron frame work is needed to give the buildings strength and rigidity. This so materially added to the cost of the country buildings that few cared to undertake the work. Not until a type of houses could be designed which could be built without the iron skeleton work was it possible for burnt clay tiles, bricks and blocks to become popular.

The development and improvement of building materials in this particular have largely removed this objection. It is possible to use terra cotta materials and hollow burnt clay blocks so that country homes can be put up at little more cost than for a wooden structure, and without the use of iron frame work. A number of structures of this type are springing up in many parts of the country and a study of some of their features is particularly valuable. Walls, partitions, roofs and ceilings are constructed of terra cotta blocks, so that the houses are not only fire proof but well protected from vibration, vermin and excessive changes in temperature. They are more durable than almost any other class of structures erected, and, like the skyscrapers of our cities, they promise to last for centuries without any great deterioration. They possess certain other advantages, such as proof against the action of weather, and thus need no painting and periodic repairs, and much cheaper to insure against fire.

One of the most recent illustrations of the modern buildings in which fire proof materials are used without iron skeleton work for supporting floors and roofs is the new Madison Avenue Presbyterian Church. The walls of this structure are of brick and hollow terra cotta blocks, and the roof consists of a great dome over 50 feet

in diameter which springs from the walls without metal support of any kind. The arched dome is built up of fire proof clay tiles averaging 6 x 12 inches, laid in courses of cement, and designed so that the keystone of the arch carries the whole load. There is not a particle of metal used for sustaining this great dome, and yet it is so perfectly fire proof that no interior fire could damage the roof or affect it in any way.

The modern terra cotta or clay tiles are burnt in kilns to a temperature of from 2000 to 2500 degrees F., and as a result of this form of manufacture it is impossible for them to be affected by the hottest fire that is likely to rage in a building, even when fed by highly inflammable material. Up to this high temperature the tiles or blocks do not warp, crack or sag. Consequently when used as floors, roofs, partitions or ceilings they restrain the spread of an interior fire.

The question of strength is the next important consideration for a builder or architect. In building the new domes and arches of fire proof tiles the cohesive strength or resistance to shearing of two hard tiles cemented together with good Portland cement is equal to 124 pounds to the square inch. The tiles are made as hard as the cement, and when made into the form of an arch the two become a homogeneous whole. But the arches are built up of several courses, so that resistance of over 2000 pounds to the square inch is obtained.

But the modern fire proof tile arch is not of so much value to the builder of the country house as the flat arches made of hollow terra cotta tiles reinforced with steel wires imbedded in the materials. The wire reinforcements carry the load and the floor or ceiling of tiles is laid on top of it. The basis of the flooring is formed of large steel wires transversely interwoven with still larger wires placed 4 inches apart. Over and through these wires the cement is placed and the tiles set longitudinally until a complete monolith or homogeneous floor is formed. The wire truss reinforcement is cut according to measurements and shipped in reels, so that a builder or contractor can easily put it in position. Every part of the metal is protected by cement mortar or fire proof clay tiles from any exposure to fire. The result is a perfect floor or ceiling is formed without the use of steel frame work, which in case of fire would resist high temperatures as much as a floor of a modern fire proof skyscraper in our cities.

Relative Strength of Spans.

The relative strength of such floor spans is greater than ever required for ordinary houses, and the span can extend to 25 and more feet by increasing the tile and reinforcement. In tests with live loads a span of 16 feet between girders has carried 733 pounds to the square foot, or a total of 187,680 pounds on the whole floor. By dispensing with steel beams a great saving is obtained. This method of building has been adopted in many city structures, notably the Chicago Post Office, where heavy loads must be carried. The metal is so imbedded in the cement mortar that it is impossible for it to rust and deteriorate, and its life is as long as the building materials which it supports.

With the flooring or ceiling once formed, the finish can be made in wood, tile or mosaic work or gravel, with suitable roofing material. Wooden beams can be laid on tops of the tiles and wooden floors nailed to them in the old way, or plastic materials which give a firm, hard, fire proof floor can be employed. The ceiling can be finished in the ordinary way or with stamped metal ceilings. Even should the latter be warped and melted by a hot interior fire it would not affect the strength of the floor, for the latter is built independent of it, and with every part of the metal inclosed in cement at least 1 inch thick.

The walls of such a building are composed of 8, 10 or 12 inch hollow tile blocks. The metal reinforcements are imbedded in the outside brick walls, so that almost any requirement of a house can be met. Where mills, factories or storage houses use this system of floors iron columns are employed for attaching the reinforcements, but an ordinary country house demands no such strength in its floors. The walls of the house are built of any desirable bricks, plain or faced, and one course of plain hollow terra cotta blocks inside of the walls for fire resisting purposes. This course of hollow blocks meets with and is joined to the blocks of the floors and partitions. In this way each room becomes a fire proof box, in which any interior fire could be confined. The hollow tiles for interior of walls are made with rough faces for wall furring, so that the ordinary plaster can be used.

Ordinary terra cotta partitions can be laid by the bricklayer, but the best Portland cement must be used, so that when it hardens it will be as firm and fire resisting as the tiles or blocks. The porous terra cotta blocks are manufactured for interior use, so that nails can be driven in them. By means of this the interior trim of wood can be nailed to the walls or base. The interior of the porous blocks is furred for receiving plaster or left smooth for paint and whitewash or enamel. Enameled and tinted fire proof clay tiles for interior decoration have been employed in the main ceilings of the first floors of the new Tiffany and Gorham buildings in New York and their effect is very striking. They illustrate a new departure in this use of tiles. The colors and glazing are burnt into the tiles after designs made by the architects, and no amount of dirt, grease or smoke can injure them. An annual washing is all that will be required to keep them in a perfectly fresh and sanitary condition. Similarly in country homes such tiles can be exposed for artistic as well as useful effects.

Partition Tiles.

The terra cotta tiles used for partitions are usually 8 x 8 or 12 x 12 inches, with the thickness adjusted to suit special cases. The partitions are usually 3 to 4 inches thick. The blocks are set up on end, except the top course, which is placed on the side to give a finish. In some of the higher priced country homes of this character the brick walls are lined with fire proof clay tiles inside and outside. The outside course is of more dense material than the inside and is hard burned, with smooth surface. The protection of the bricks from disintegrating effects of weather is thus so great as to increase the durability of the building from 10 to 20 per cent.

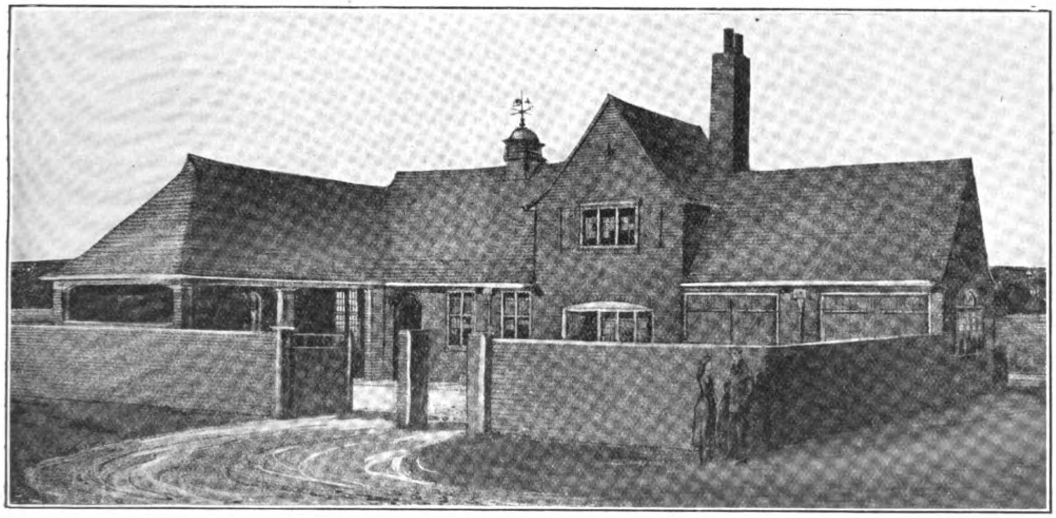
There is another use of hollow fire proof clay products that has many advantages. They are sometimes laid on wooden beams which are strung across from brick walls to carry the load. A 3 or 4 inch course of hollow blocks protects the wood from fire up to a temperature of nearly 1000 degrees. After that, in spite of the nonconducting qualities of the terra cotta, the wooden beams might char and fall. The under parts of the beams are protected by 2-inch ceiling blocks secured by means of screws and washers. In this case the fire can cause no damage until the metal screws and washers melt or warp and thus loosen the blocks. This method of structure has been approved by many city building commissioners, so that walls and ceilings are rendered comparatively fire proof.

Fire proof clay building blocks and tiles are the lightest of all materials of this class, and the additional load which they give to a floor supported by wooden beams is very inconsiderable. A cubic foot of terra cotta hollow tile weighs about 40 pounds, while the lightest cinder concrete suitable for floors and arches weighs upward of 90 pounds. A wooden floor composed of thin maple strips of flooring, spruce sleepers and plastering would weigh nearly half as much as a floor composed of wooden beams with an under course of hollow tile blocks and an upper one of the same material. Where reinforced metal trusses are used the difference in the weight is slightly increased.

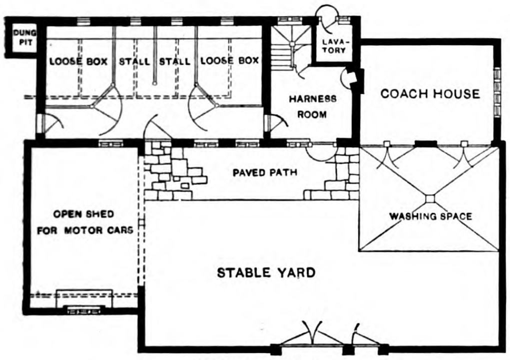
The whole question of adapting burnt clay products to house construction in the country is one of cost, durability, strength and beauty. The cost has been so materially reduced in recent years by the introduction of labor saving machinery that it is almost on a par with wooden construction. In special localities fire proof clay tile houses have been built at the same estimated cost demanded for wooden frame structures. There is no question about the greater durability of the terra cotta house nor any doubt about its fire proof advantages. The strength of floors and arches without the use of iron beams and girders has likewise been satisfactorily solved in the last few years. The tests given have been made to meet requirements of city laws, which are much more stringent than those in the country districts.

An English Carriage House and Stable.

For the interest which it may have to American readers we present herewith a general view and main floor plan of a carriage house and stable just finished at Wonersh in the County of Surrey, England, the plan clearly showing the arrangement of the stalls, the position of the harness room, the space for washing the carriages and the open shed for motor cars. It will be seen that the stable yard is enclosed with a high board fence and is entered by means of a single and double gateway. According to the particulars available the stable is built of local purple gray stocks with red brick dressings, while the roof is covered with old tiles. The external doors are painted a gray-green, while the door and window frames are white.



General View.



Main Floor Plan.

An English Carriage House and Stable.

Specifications for Hollow Building Blocks.

At the recent convention of the Northwestern Cement Products Association, held in Minneapolis, Minn., the following standard specifications for hollow cement building blocks were, after some discussion, adopted:

Sand.—Such material as will pass through a screen ¼-inch mesh and is retained in screen having No. 40 mesh. This applies to river sand, bank sand or screenings from a stone crusher.

Gravel.—Such stone or rock, obtained either from a bank or river, of such size as is retained in a screen having ¼-inch mesh.

Crushed Stone.—Such stone from a crusher as is retained in a ¼-inch screen.

Bank Gravel.—Such material as is obtained from a pit or river containing both sand and gravel.

Aggregate.—Any material, such as broken stone, gravel, or such fragments used with cement and sand mortar in making concrete for the purpose of reducing the cost and adding to the strength.

Voids.—The space existing between particles of sand, crushed stone, or materials of which an aggregate is composed.

Cement.—Any American or Portland cement, which will pass the tests required by the American Society for Testing Materials.

Quality of Sand.—Sand suitable for concrete work must not be finer than the above described; must be sharp and gritty; not soft or loamy; must be free from loam or other foreign material, and must not contain any perceptible amount of clay or other soluble matter. Some authorities concede that clay to the extent of 10 per cent. in sand or gravel is not harmful. That this committee is of the opinion that any perceptible amount of clay is unsafe. Crushed stone must be reasonably free from dust and must be retained on the same size screen as bank sand, viz., ¼ inch. Gravel or crushed stone must be free from loam, dust, or other foreign material, and must contain no soft or rotten stone.

Determination of Amount of Cement to Be Used with Aggregate.—A theoretically correct concrete should consist of sand and gravel, or crushed stone, or a combination of them, containing any amount of cement equal to the voids in such combination. In other words, interstices should be filled with cement.

To state this in another way, if the concrete is made up of sand and gravel, such proportion of cement should be used with the sand as is equal to the voids in the sand, and such quantity of this resulting mortar of sand and cement should be used with the crushed stone or gravel, as will fill all voids in the crushed stone or gravel.

Re-stating this in a few words, the cement should fill the voids in the sand, and the resulting mortar should fill the voids in the aggregate.

Determination of Voids.—To determine the voids in the sand, or the material to be used as an aggregate, what is known as the "water test" is employed. In preparing for this test the sand or gravel must be perfectly dry. Sand has greater volume when wet.

A receptacle holding a known amount, such as a quart jar, is filled with the material to be tested, sand for example, and into this receptacle is poured as much water as the sand or other material will absorb. The water should be measured. The amount of water absorbed indicates the voids and also indicates the exact amount of cement which it is necessary to use in order to produce a solid concrete.

In making hollow blocks, if no gravel or other coarse aggregate is used, the result of this test should give the proportions of sand and cement to be used in block manufacture. Average sand will absorb 25 to 35 per cent. of water, indicating from 25 to 35 per cent. of voids—also indicating that the proportions of one part of cement to from three to five parts of sand are required to make a solid block.

The proper selection of sand and aggregate material is important. Care should be taken that the particles vary so in size as to reduce the voids to the smallest amount possible.

With this careful selection the amount of cement required to produce good work is greatly reduced.

Provided that in defining the proportions of cement we mean that a given measure of cement is one portion and that multiples of that measure of aggregates as properly combined, under the water test, shall determine the proportion, if found under the test that five parts crushed stone or gravel will take three portions of sand to fill the voids without increasing the bulk and that one portion of cement shall fill the remaining voids, this proportion shall be a 1 to 5 mixture.

Mixing.—After the materials are selected they should be mixed together dry until thoroughly incorporated, or, in other words, until the mass is of an absolutely uniform color. Water should then be applied and the thorough mixing repeated. The amount of water should be in all cases as great as possible, without causing the materials to stick to the molds when the stone is removed.

A little more care in the treatment of the face plates of any machine will enable the manufacturer to use a wetter concrete than is usually employed. Only such size batches should be mixed at one time as can be used up within 30 minutes from the time the water has been added.

Manufacturing.—The concrete should be placed in the mold in small quantities, and tamping should begin immediately upon the placing of the first shovelful and continue until the mold is full. The material should be tamped with a tamper having a small face, and short, quick, sharp blows should be struck.

In faced blocks the face should be composed of two parts sand and one part of cement, the same being mixed in the manner described above.

Owing, however, to the excess of cement used in facing, and owing further to the fact that the cement is what makes concrete sticky, the facing cannot be used as wet as the balance of the block is made. Great care should be taken to tamp the concrete thoroughly into the facing, so as to unite the two into one solid stone.

In the wet process the amount of water used is such as will produce a plastic, or flowing condition, in the concrete, but not enough to wash the cement from the other material. When placing the material in the molds the entire mold is filled with one pouring.

No stone having transverse ties or webs cracked should be used, or even allowed to cure. Should a slight crack occur in moving the green stone, throw the material back and make it over. In no case use a cracked stone in a building.

Curing.—All stone made by the medium wet, or medium dry process, should be made under cover, and kept under cover for at least ten days, protected from the dry currents of air. If shed room is not available to store a ten days' output the blocks should be carried out after the initial set has taken place, and covered with canvas, hay or other covering which will retain moisture and at the same time keep the dry air from circulating around the block. Under no circumstances should blocks be made under the direct rays of the sun, nor should blocks made by this process be exposed to either sunshine or dry winds while curing.

The blocks should be gently sprinkled as soon as possible after making—that is, just as soon as the cement has set sufficiently that it will not wash. Blocks should be kept wet from ten days to two weeks, and should never be removed from the yard for the purpose of using in a building until they are from 30 to 60 days old. This is very important. A green block will surely crack in the building on account of shrinkage.

Laying.—In laying cement stone a soft mortar composed of one-half cement mortar and one-half lime mortar should be used. This mortar should be made with fine sand free from stone and should be buttered on the ends of the stone before laying. The stone should be laid in the mortar and worked down. Do not leave end joints open until after the building is completed, because when the end joints are filled at this time shrinkage in mortar is liable to loosen it, causing the mortar to fall out, leaving openings through the wall.

The spreading of mortar is very important, because if mortar is unevenly spread so that it is thicker under one portion of the stone than under the other, a leverage is created, which under the weight of the wall is liable to produce a crack in the stone.

Coloring.—In using coloring matter with concrete the color should always be mixed with the cement dry, before any sand or water are added. This mixing should be thorough, so that the mixture is uniform in color. After this mixing the combination is treated in the same way as clear cement.

◆◆◆

RECENT experiments to ascertain what human weight could be crowded into a small space have shown that 40 men, weighing an aggregate of 6528 pounds, may be placed within a space measuring just 6 feet square. This corresponds to 181.3 pounds per square foot, a figure much higher than the 100 pounds recommended by Trautwine as being amply large to take care of both mere weight and impact, while it has even been stated that weights exceeding 45 pounds were so rare as to require little consideration. It follows from the late experiments that weights of as much as 140 pounds per square foot must be quite common on station platforms, and that as much as 80 pounds must frequently be found in social gatherings.

◆◆◆

American and British Building Practice.

Probably few American contractors and builders who have not had experience abroad realize the width of the gap which separates English and American building practice. The difference was very clearly brought out in a recent meeting of the Royal Institute of British Architects, when a general discussion of the topic took place. The impulse was given by R. Denell, managing director of the Waring-White Building Company, in a paper entitled "American Methods of Erecting Buildings."

The topic of broadcast interest that came up for consideration was in many respects the Governmental and municipal jurisdiction over building obtaining in the two fields. It appears that in Great Britain each particular feature of a building must be passed upon by a separate bureau, and that the possible complications in gaining building permits are myriad. Mr. Denell is outspoken in his preference for the American municipal scheme of concentrated control of building in one department, and he was strongly seconded in this view by so conservative a member of the Institute as William Woodward.

Following this lead several speakers joined in a general condemnation of all Government control of architectural operations. John Slater said he feared that the relief from responsibility of the architects might lead to the ultimate demoralization of the profession, for the exercise of initiative was so thoroughly discouraged by hampering regulations. Andrew T. Taylor, late of Montreal, drew a very interesting distinction between the necessity of such supervision on the two fields. He personally had no doubt that rigid supervision over the British architect and builder might advantageously be abolished, but he was not at all sanguine of the advisability of such a step in America. In fact he drew a very uncomplimentary picture of the professional integrity and even of the abilities of some American architects.

While the major portion of the leading paper that was devoted to building materials was given over to the steel structure, there was still much valuable matter on those materials which are used in common in the United States and England. Touching brick work, Mr. Denell conceded more artistic effects to America, but he was of the opinion that the English principle of a uniform bond conducted to structural superiority. The common English brick is considerably larger than the American—about the size of the American glazed brick, in fact. It appeared also that white limestone is the favorite for building in England as here, but in granite and marble they have not our variety from which to choose. There was no subsequent comment in the meeting on this score.

The widespread and artistic application of terra cotta to building in this country was very decidedly commended, and several pictures were shown of examples of exterior decoration in the material on this side. Notable among these was the *Herald* Building. The British architect's principal excuse for delinquency in this particular is the inability to get out large blocks of the material. In interior decoration by means of terra cotta he has fallen behind, because paucity of varieties of clay prevents securing polychromatic effects.

Ornamental iron and bronze work is nothing like so extensively used in England as here, probably because it has not been fostered by a demand for fire resisting material such as exists in America. This point was a matter of merely descriptive comment on the part of the principal speaker, but the almost exclusive use of iron in fire proof staircase construction came in for a critical observation. In Mr. Denell's opinion we would do well to emulate the British concrete construction wherever it is applicable.

The steel frame in building, being the feature in which American and British practice are most widely diverg-

ent, naturally brought out the most extended discussion. It is, moreover, the feature of most interest to engineers as well as architects. In tone the general comment was manifestly a protest against the intrusion of an incongruity in the ancient field of architecture; an attempt to discredit the virtues of an institution inimical to the interests of architects of the old school. The leaders of British architectural progress, however, indicated in the meeting that they had learned the lesson taught to the conservative interests of the American school more than a decade ago; that the great steel frame building of to-day is the child of modern economic conditions, and as such inevitable.

Mr. Dennell was particularly optimistic of the durability of the steel frame and of its stability, even when carried to great hights. He thought that the 40-story skyscraper was entirely feasible from the structural point of view, but did not anticipate such a development because of economic restrictions. In his opinion the point must soon be reached when the revenue accruing from additional stories will not pay for the consequent consumption of space in the lower floors by increase of plant. Those operating in the field of the skyscraper will appreciate from this observation of a leading British exponent just how difficult it is to accurately foresee developments in a field without a basis of actual experience there. Most Americans will agree with Mr. Denell, though, that conditions of modern life are changing faster than buildings depreciate, thereby necessitating rebuilding before the natural life is run. In conclusion, the speaker expressed the belief that the steel structure was as enduring as any other class of building and more so when carefully imbedded in concrete.

United Employers' Association of Roofers and Sheet Metal Workers, New York City.

The contracting sheet metal workers and roofers of New York City have recently organized and secured a State charter under the name of the United Employers' Association of Roofers and Sheet Metal Workers of Greater New York. While the association has been in the embryo for practically six months, it is only during the last few weeks that the organization has become fully an accomplished fact. At the present time the Board of Governors holds stated meetings in the rooms at 190 Bowery, New York City. The primary object is to secure benefits ordinarily accruing from association work. It is to maintain the closed shop principle, recognizing the local journeymen's union of sheet metal workers. The annual election and business meeting, held February 13, at the Teutonic Assembly Rooms, 150 Third avenue, resulted as follows:

President, George Brown, Jr.
First Vice-President, Jacob Forster.
Second Vice-President, Harry Kiefer.
Secretary, Felix Menz.
Treasurer, Albin Anderson.

On Tuesday evening, January 30, a committee from the National Association of Master Sheet Metal Workers, composed of William Martin, of New York, and C. W. Smith and O. H. A. Milhan, of Brooklyn, met members of the Employers' Association and talked over in an informal way the desirability of their body affiliating itself with the National Association. They promised that the Board of Governors would take the matter before the association and that it would receive careful attention.

Two picketing bills have been introduced in the Massachusetts Legislature. One is favored by the Employers' Association of Springfield, which was represented at a hearing on the bill at Boston on February 14. The bill provides that, "No person shall by intimidation or force prevent or seek to prevent a person from entering into or continuing in the employment of any person or corporation. Threat of loss of employment, or threat to obstruct or prevent the obtaining of employment, or threat to injure or interfere with the business of any employer to compel him to discharge from employment or to refrain from employing any person, shall be intimidation within the meaning of this section. Whoever violates any provision of this section shall be punished by a fine of not more than $50 for each offence." Another bill is fathered by the labor unions and provides as follows: "In case of a strike or lockout or other dispute between an employer and his employees it shall be lawful for the employees or for other persons to walk upon the public streets and ways in the vicinity of the place of employment or in any other place to which they have lawful access, and in a peaceful way to converse with persons intending to go to such employer for work, for the purpose of informing them of actual facts in order to induce them not to enter into or not to continue in said employer's service."

New Publications.

Hand Book of Cost Data for Contractors and Engineers. By H. P. Gillette; 610 pages. Size 4½ x 6¾ inches. Numerous illustrations. Bound in morocco, with gilt edges. Pocketbook form. Published by Myron C. Clark Publishing Company. Price $4, postpaid.

This, as its title indicates, is a reference book giving methods of construction and actual costs of materials and labor on numerous engineering works. The author points out that the book under review differs from the usual price book as prepared for the use of house builders, in that it is a book in which costs are analyzed and discussed. A contract *price*, he says, is one thing, and a contract *cost* is an entirely different thing, in spite of the common confusion of these terms. In order to fully understand any analysis of unit costs it is necessary to have a detailed description of the methods used in construction and operation. While therefore itemized cost data occupies scores of pages in this book, there are many more scores of pages devoted to descriptions of how the work was done, organization of the forces and the machines used. The records in all cases are actual records taken from every available source of published information, from personal letters signed by engineers and contractors and from the author's own records.

Some idea of the scope of the work may be gathered from some of the headings of the 14 sections into which the book is divided. The first relates to cost keeping, preparing estimates, organization of forces, etc. The next deals with the cost of earth excavation, and then are cost of rock excavation, quarrying and crushing; cost of roads, pavements, walks, etc.; cost of stone masonry; cost of concrete construction of all kinds; cost of water works; cost of sewers, tile drains, etc.; cost of piling, trestling and timber work; cost of erecting buildings; cost of bridge erection and painting, and the cost of miscellaneous structures.

The Slate Roofer. By D. Auld, Jr., and F. H. Conger. Size 4 x 8¼ inches; 96 pages; numerous tables and illustrations. Bound in stiff covers. Published by the Auld & Conger Company. Price 50 cents, postpaid.

This is a revised and enlarged edition of a little work which will be found exceedingly convenient to the architect, builder and roofer, comprising as it does roofing slate tables, rules for measuring slate work, designs for ornamental work, showing some of the effects which may be produced by the use of ornamental shingles, the nails required for a square, together with rules and information for the use of all having to do with the roofing business. The illustrations are of a nature to prove helpful in the matter of doing roofing work, as they show proper methods of construction, the way in which slate should laid and the tools employed by the slater. The tables are numerous, something over 40 pages being devoted to them. At the close of the little work are illustrated directions for setting slate blackboards.

SOME discussion has gone on in England recently over the proposal to introduce the skyscraper steel structure in London. B. H. Thwaite, the well known metallurgical engineer, writes very favorably in London *Public Works* of the American tall building. He says there

are in the United States many examples of artistic excellence in the lofty buildings of New York, Chicago and other cities, pointing out also that steel frame buildings are less costly and can be erected more rapidly than any other type of permanent buildings. The London County Council, however, interprets the Building acts as opposing the erection of steel frame buildings in the way that would render them most advantageous. An effort is being made to secure some relaxation of the rules in respect to the use of steel.

Cleveland Sheet Metal Contractors' Association.

The annual meeting of the Sheet Metal Contractors' Association was held in the Chamber of Commerce Building, Cleveland, Ohio, recently. A large number of the members were in attendance. The report of the treasurer showed the finances of the association to be in a satisfactory state, and the reports of other officers showed its affairs to be in a flourishing condition. The association adopted a policy of enlarging its scope and influence in trade matters, and active steps will be taken during the winter season to strengthen its position in every way. John Callaghan of J. Callaghan & Sons and M. Long of the Cleveland Metal Roofing & Ceiling Company were appointed a committee to arrange a banquet to be held at some subsequent meeting. The officers elected for the ensuing year are as follows:

President, A. H. Rudolph of the Rudolph & Sons Company.

Vice-President, Robert Kain of Kain & Tuck.

Treasurer, W. M. Esterly of Mannen & Esterly.

Secretary, E. T. Bohm.

Mr. Bohm was for many years secretary of the Vulcan Club, which is succeeded by the new association. G. F. Thesmacher of Riester & Thesmacher and J. S. Harrison of Harrison Brothers were elected delegates to the Executive Board of the Building Trades Employers' Association.

Exhibit of Work at Baron De Hirsch Trade School.

An exhibition of the work executed by members of the twenty-second class of the Baron de Hirsch Trade School was held in the building, 222 East 64th Street, New York City, on the evening of January 30. The display was one of unusual interest and attracted much attention on the part of visitors. The class in carpentry showed examples of miter cutting, window and door frames, and as a specimen of their skill had constructed a house with porch in miniature and had covered the exterior with clapboards and shingles. The prize for the most satisfactory progress was awarded to Abram Levy. An interesting feature of the occasion was the presentation to each graduate of a kit of tools.

The plumbing class, which is the largest in the school, had a most creditable exhibit of various joint wipings, as well as joining fittings to lead and iron pipe. The course consists of five and a half months' work, five days a week, and the pupils on satisfactorily completing the course are given a diploma, while special prizes are awarded to pupils for the most satisfactory progress in their respective departments.

The New Pennsylvania Railroad Station.

The final plans for the mammoth station of the Pennsylvania Railroad now in process of construction in New York City have been filed with the Bureau of Buildings, but they show few differences in detail from those exhibited two years ago to the Board of Estimate and displayed later in plaster model at the St. Louis Fair. Instead of being 60 feet high, the main structure will reach 65 feet, and the waiting room, which is under the central clear story vault, will rise to 155 feet, instead of 141 feet. The style of architecture adheres closely to the Doric and the material to be used is granite. When completed it will have much the appearance of a magnified Grecian temple, as the length of the structure will be 771.6 feet and the width 433.4 feet. The station proper will occupy an inclosure bounded by Eighth and Ninth avenues and Thirty-first and Thirty-third streets. The north side toward Thirty-third street will have a vestibuled entrance with a great clock above supported by sculptured figures. The architects, McKim, Mead and White, estimate the cost of the superstructure at $4,000,000. The excavation for the foundations, which is now in progress and has been for some time past, is in part in solid rock, and will add to the price of the site more than $5,000,000. It is expected that altogether something like $50,000,000 will be expended for the station and tunnel connections.

◆

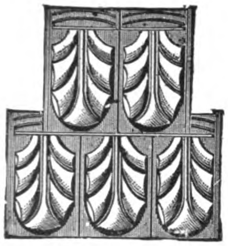
At the annual meeting of the Builders' Exchange, of Evansville, Ind., held early in the year, reports were presented showing the organization to be in a most prosperous condition. It was organized two years ago with 32 charter members and now has 106 on its rolls. A Board of Directors was elected at this meeting and it organized by selecting the following officers for the ensuing year: President, S. G. Rickwood; vice-president, H. A. Lansing, and secretary, J. W. Spain.

CONTENTS.

Editorial— PAGE.

Correspondence—

Novelties—



NEW CENTURY

PAINTED TIN
GALVANIZED
COPPER : : : :

....Get A Sample....

OF THE

New Century Patent Metal Shingle

And see if it has not the best Side Lock you ever saw.
We guarantee it has. A Live Agent wanted in every town.

MANUFACTURED SOLELY BY

Chattanooga Roofing & Foundry Co.,

CHATTANOOGA, TENN., U. S. A.

Carpenter's Details

can be shown easily, clearly and quickly by the D. C. Isometric sketching paper. No guess work or chance for mistakes—everything can be shown exactly right and in measurable proportions, the same as any drawing.

Practical Perspective 50 Cents

is a valuable little handbook, describing and illustrating the application of this simple system of drawing.

For $1.00

we will send the book and two pads of the paper—enough to last for some time and show how useful it can be made.

Saves time and money.

DAVID WILLIAMS COMPANY
14-16 Park Place, New York.

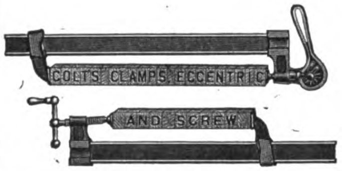
84 Page Catalogue

Add a few good books to your library: Read and grow.

Our 84 page catalogue gives facts about best books for the building trades.

Sent at your request.

DAVID WILLIAMS COMPANY
14-16 PARK PLACE - NEW YORK



I & U Shaped Steel Bar

Any Length Desired.

QUICK ACTING. TIME SAVING.

Catalogue free.

BATAVIA CLAMP CO.

23 Center Street, BATAVIA, N. Y.

Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

PUBLISHED MONTHLY

To all parts United States, British America and Mexico. - $1.00 Per Year
To all other Countries, - - - - - - - - 1.25 Per Year

Advertising Rates on Application.

BUSINESS OFFICES.

NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHERS........14-16 Park Place.
PHILADELPHIA—S S. RECKEFUS, Manager..Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—WALTER C. ENGLISH, Manager........Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, Manager........Park Building, 357 Fifth Avenue.
CHICAGO—A. A. AINSWORTH, Manager........Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—HENRY SMITH, Manager........Pickering Building, Fifth and Main Streets.
CLEVELAND—EZRA S. ADAMS, Manager........The Cuyahoga, 311 Superior Street.
LONDON OFFICE........Hastings House, Norfolk Street, Strand.
AUSTRALIAN OFFICES........MELBOURNE, 231 Elizabeth Street.
SYDNEY, Palings Buildings.

ENTERED AT THE POST OFFICE, NEW YORK AS SECOND-CLASS MATTER.

Digitized by Google

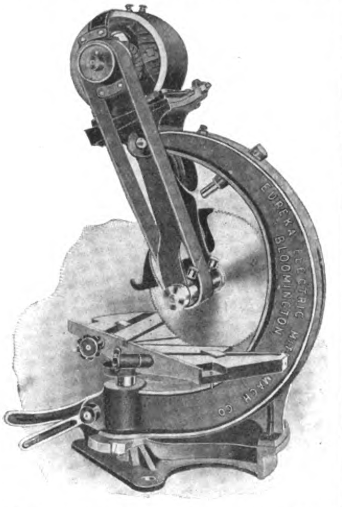
Original from
UNIVERSITY OF MICHIGAN

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

NOVELTIES.

Eureka Electric Miter Machine.

The miter machine which we illustrate in Fig. 1 is manufactured by the Eureka Electric Miter Machine Company, Bloomington, Ill., to overcome the difficulties encountered in perfect miter making by hand. The machine consists of a circular saw operated by an electric motor, belt connected. The saw is attached to a swinging arm which carries it forward and back and the arm and saw are suspended from the top of the suporting arch which rotates on a hub at the base and turns from side to side to an angle of 45 degrees, so that the saw can enter the convergent slots at these angles and also at the right angle or cross cut in the front. The saw is 12 inches in diameter and is hammered to a test of 5000 revolutions and travels at the rate of about two miles a minute. The motor is only of ¾ horse-power capacity and is direct current, and the company can supply them for either 110, 220 or 500 volts according to the current in use. The table shown on the machine illustrated permits the saw to cut right and left 45-degree angles and a straight cut and is largely designed for the use of frame makers. It is supplied with clamps for holding the molding firmly in place which are attached to double threaded screws. The universal table which permits of more general use and is designed for contractors, builders, cabinet makers, furniture factories and mills can be fitted to the machine in place of the table shown, and it is designed to cut any angle required in general joining work.



Novelties.—Fig. 1.—Eureka Electric Miter Machine.

Hood's Lumberman's and Builders' Ready Reckoner.

We have received, with the compliments of the Hood Furnace & Supply Company, Corning, N. Y., a copy of a valuable little work entitled "Hood's Lumbermen's and Builders' Ready Reckoner of Boards, Studding, Joists and Timber." The author is C. S. Hood, who, having spent 15 years in the wholesale and retail lumber business, and having been required to find the number of feet in a given number of pieces of board, joists and timber, in bills varying from a wagon load to a boat load, became satisfied of the great convenience which would result from tables showing the number of feet in pieces of varying size. He therefore set about the compilation of tables of bills of lumber, and the little work in question is the result. In publishing the new edition of the Reckoner it has been abbreviated somewhat in order to meet the need where bills are to be figured for the average builder by the retail lumber trade. The book is issued by the company as an advertising medium for its line of heaters and supply specialties, and copies can be secured for 50 cents each by those purchasing goods from the company. Naturally a portion of it is devoted to an exposition of the merits of the furnaces made by the concern, embracing such constructions as the Cheerful Home Improved, the Cottage Home, the New Home and the Hot Blast. Attention is also given to the Hood furnace regulator, hot air dampers and some facts which will be found interesting for builders. The entire make up is such as to render the little work convenient for reference, and, as the company puts it, the architect, lumberman, builder and farmer need the book, while "*all* need a Hood furnace."

The Ideal Ventilator.

The Ideal Ventilator Company, 338 Weybosset street, Providence, R. I., is distributing among the trade an interesting little pamphlet illustrating and describing the Ideal Ventilator, for which strong claims are made. The ventilator is made of glass enclosed in a wood or metal frame and is placed in brackets adjustable to 20 degrees deflection. It can if desired be placed parallel with the window and may be attached or removed without defacing the window sash or frame. When placed at the angle stated fresh incoming air is deflected toward the center of the ceiling of a room, where it meets the warmer air with which it becomes thoroughly mixed. In this way, it is pointed out, a good circulation is produced without subjecting persons in the room to drafts. The device is adapted to old buildings as well as new; is neat and attractive in appearance and is easily regulated to meet varying atmospheric conditions. When used in business offices the ventilator may be set at an angle of 10 degrees, deflecting the air currents upward and away from the person sitting at a desk nearby, while the room is constantly receiving a supply of fresh air. The little pamphlet points out the value of the Ideal ventilator in connection with schoolrooms, drafting rooms of architects or civil engineers and the designers of machinery, in hospitals, sleeping rooms, &c. Numerous testimonial letters are presented from some of those who have used the ventilator, showing the estimation in which it is held by those who have practically demonstrated its merits. In addition there is a long list of names of buildings, institutions, concerns, clubs, &c., using the device.

Sherman Patent Roofing Nail.

A roofing nail with a large head formed in one piece has been brought out by the H. B. Sherman Mfg. Company, Battle Creek, Mich., its general appearance, full size, being shown in Fig. 2 of the illustrations. It is designed as a time saver and a money saver, in accordance with the following ideas: The putting together of tin caps and nails takes time, and to be compared with these is the Sherman patent nail with stem riveted both sides of the head in one piece, as stated. The nails have heads thicker than a tin cap, in order that buckling of the head, with resultant leakage, is prevented, and the life of the nail, it is felt, is increased in that the head will not rust through like a tin cap. The nail provides a head which is larger than that of a large head wire nail and on this account also it is looked upon as making it possible to use a minimum number of nails in the same amount of roofing—one-fourth that ordinarily required, the company says. The nails are shipped in bulk, 100 pounds to the keg, but the company has a mailing package by which samples of the nails can be distributed for examination by those interested. It is probable that any of our readers can avail themselves of this chance to understand this new product to best advantage by addressing the company.

Fig. 2.—Sherman Patent One-Piece Roofing Nail.

The Cemaco Concrete Block Machine.

A concrete block machine embodying a number of interesting features and which has been placed upon the market with a view to meeting the demands for a medium priced construction is the Cemaco, made by the Cement Machinery Company, Jackson, Mich., and illustrated in Fig. 3 of the engravings. The machine, which is shown open with one of the blocks immediately in front of it, is adjustable to widths of 6, 8, 10 and 12 inches, and turns out a block 24 inches long and 8 inches high. The claim is made that as there is only one air chamber there is a saving in concrete and for a practical and durable "face-side" machine it "stands in a class by itself." The machine is of such construction that perfect corners are always assured and at the same time the operation is rapid and smooth. A catalogue which has been issued by the company illustrates and describes at length the Normandin hollow concrete block machines and devices, and there are also given a number of half-tone engravings of buildings in various parts of the country constructed of hollow concrete blocks turned out on the machines of the company. In fact, the catalogue deals with the history and development of Normandin block machines and their product and contains a vast amount of information relating to the subject, which has been put into shape to be of use to those interested in the hollow block industry.

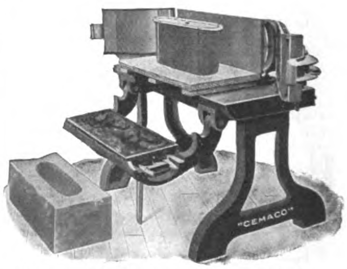


Fig. 3.—The Cemaco Concrete Block Machine.

The "Napanoch" Pocket Knife Tool Kit.

A very useful kit of tools of such size as may be readily carried in the pocket is the combination which is being offered under the name "Napanoch" by U. J. Ulery, 7 Warren street, New York City. An illustration of the tools contained in the kit together with the leather pocket book in which they are carried is presented in Fig. 4 of the engravings. The point is made that any tool can be firmly attached to the pocket knife as indicated by the arrow in a second, by a simple backward wrist movement and is quickly removed by a forward wrist movement. The leather pocket book shown is 4½ inches long by 3¾ inches wide and is ¾ of an inch thick. The pocket knife marked 2 in the illustration is 3⅞ inches in length; No. 3 is a reamer, 3⅛ inches long; No. 4 is a file; No. 5 a saw; No. 6 a chisel and No. 7 a screw driver. The manufacturer makes the statement that this outfit is more useful than any other pocket knife combination made; that it is turned out by skilled workmen, of the best material, and is fully warranted.

Novelties.—Fig. 4.—The "Napanoch" Pocket Knife Tool Kit.

Catalogue of Metal Roofing.

A valuable catalogue relating to the manufacture of tin plate for roofing purposes and calling attention to the practical points of tin roofing has been brought out by the Merchant & Evans Company, Philadelphia, Pa. It outlines the various classes of roofing and then analyzes the qualities of roofing with respect to their lightness in weight, ease of repair, their resistance to storms, fire and lightning and to their value in ornamentation. The merits of wood shingles, slag, gravel and composition roofs, terra cotta and slate shingles and cement are taken up in turn, as are metallic roofs, such as tin and copper tiles, corrugated galvanized iron, sheet copper and roofing tin. Perhaps the most interesting portion will be the account of the processes of tin plate manufacture, the information concerning the thickness and evenness of tin plate coatings and the assortment and gradings of plates after coating. Of a directly practical nature is an essay on how to construct a metal roof, subdivided as to the roof proper; the ridges, hips, valleys, gussets; the eaves, cornices and eave courses; flashing and counter flashing; gutter and spouting and including the method of the application of the standing seam, of the cleat and the like. One practical detail of interest is a table of the approximate weights of roofing materials for one square foot of roofing surface, and all in all the book is one that is well calculated to strengthen the roofer in any stand he may take with respect to the value of metal roofing. The book is paper covered, with pages 5½ x 8 inches in size and is artistically printed.

The Simonds Mfg. Company in Canada.

The Simonds Mfg. Company, Fitchburg, Mass., maker of saws of various kinds for both hand and power, and machine knives, has taken over the plants, good will and business of the Canada Saw Company, Limited, having factories at Montreal, St. John, N. B., Ottawa and Toronto. The Canada Saw Company, Limited, began business in January, 1904, by the amalgamation and absorption of the James Robertson Saw Company of Montreal, Toronto and St. John, N. B., which had been in business since 1868; and the Ottawa Saw Company, Ottawa, Ont., established 1893. It is the intention of the Simonds Mfg. Company to take over the charter of the Canada Saw Company and change the name to the Simonds Canada Saw Company, later enlarging the business by adding to it the manufacture of all kinds of machine knives, similar to those long made by the company in the United States. The formal transfer of these important interests to the Simonds Mfg. Company representatives was made at the beginning of the new year, and it now has in Montreal an entirely new factory, which is nearly completed, together with an option on a tract of land adjoining the present site, which is 100 x 600 feet and close to both the Grand Trunk and Canadian Pacific Railroads. The Canadian Dumping Clause act, so called, is the reason given by the Simonds Mfg. Company for its purchase of these well-established saw businesses, together with the fact that saws can best be marketed close to the timber supply. It is the company's intention to continue the management and working force of the Canada Saw Company, thus giving the new Simonds Canada Saw Company a start with a long established business. As soon as the machinery, &c., necessary can be installed the company will begin to extend its line of manufacture, making in Canada as fast as possible exactly the same quality tools as are now made by it in the United States.

Design of Hardwood Mantel.

In the equipment of the modern up-to-date dwelling a feature of several of the rooms is a mantel of such design and construction as to enhance the artistic effects of the apartment in which it is placed. Much attention has been given to the production of hardwood mantels and at the present time there are on the market such a variety as to meet practically every known requirement. As illustrative of what may be accomplished in this line we show in Fig. 5 of the engravings a front elevation of a hardwood mantel selected from the very extensive assortment turned out by the Foster-Munger Company, West Twentieth and Sangamon streets, Chicago, Ill. The mantel is finished in either quarter sawed oak with a golden polished finish or birch stained to imitate cherry or polished mahogany. The hight of the mantel is 7 feet 2½ inches and the width is 5 feet. The French plate mirror is 20 x 36 inches without bevel and extends down behind the main shelf. The tile opening is 36 x 39 inches. These mantels, as furnished complete and ready to set up, comprise the finished woodwork, the enameled tile for the face and hearth, the grate, tile frame, &c. Various other designs of hardwood mantels, as well as leading specialties embracing among other things artistic designs of wood carpet and grill work, are shown in the 802-page catalogue recently sent out by the company and reference to which was made in these columns a short time ago.

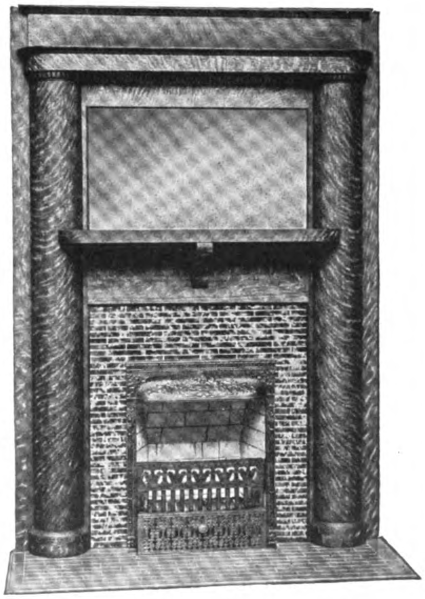


Fig. 5.—Design of Hardwood Mantel.

Diamond Expansion Shields.

The use of reinforced concrete in building construction has increased

very rapidly and with it a growing demand for an expansion bolt that can be used for attaching fixtures, &c., to floor, which oftentimes are not more than 2 inches in thickness. To meet this demand, The Diamond Expansion Bolt Company, 9 and 15 Murray street, New York City, is making three new sizes of the Diamond Expansion Bolt, shown in Fig. 6, as follows: for ⅜, ½, and ⅝ diameter bolt, the shields of which are only 1½ inches in length. The Diamond Expansion Shield is now made in sizes ranging from ⅛ to 2 inches diameter of screw. The smaller sizes are used with regular wood screws and the larger sizes with the common lag screws.

Novelties.—Fig. 6.—The Diamond Expansion Shield.

TRADE NOTES.

E. W. Edwards, president and general manager of the Edwards Mfg. Company, "the Sheet Metal Folks," Cincinnati, Ohio, is at present on a two months' tour of the West, embracing Kansas City, Denver, Colorado Springs, Salt Lake City, San Francisco, Los Angeles and the Grand Canyon of Arizona. Mr. Edwards is accompanied by his wife and family and the trip is one partly of business and partly of pleasure.

Some interesting particulars touching the merits of the Perfection cement block machine are to be found in the advertisement of the Enterprise Foundry Company, 81 Olean street, Rochester, N. Y., which appears in another part of this issue. The machine is constructed of iron and has parts so arranged that it tamps on the face—an important fact to consider, it is pointed out, when purchasing a cement block machine. The statement is made that this is just the thing for the mason, builder, contractor or any person with small capital desiring to enter into a profitable business. The weight of the machine is given as 700 pounds and the price at a figure which cannot fail to command attention.

The Duby & Shinn Mfg. Company, Incorporated, makes the announcement that it has combined its office and works, and requests that hereafter all communications be addressed to 34 East Twenty-ninth street, New York City.

The F. D. Kees Mfg. Company, Beatrice, Neb., calls attention in another part of this issue to Gossett's detachable suspension hinges and states that screens attached with them are easily put up or removed. No tools or ladder are required and there are other features about the hinges which interested builders can obtain on application to the company. A sample pair of hinges will be sent free to any architect, contractor or builder who may make application for them.

The Berger Mfg. Company, Canton, Ohio, has issued an invitation to its friends in the trade to be present at the annual convention of the Ohio Hardware Association, which will be held in Canton February 27 and 28 and March 1. The company invites its friends when visiting the city to call and investigate its modern methods of sheet metal production, and in conclusion says: "We want you to come—we expect you to come. 'Our latch string' will be hanging out all the time you are in this city."

The Chicago Machinery Exchange, 13 and 15 North Canal street, Chicago, Ill., shows in its advertising space this month a number of wood working machines which will be found of special interest to carpenters and builders. These are referred to as being modern in design and construction, with improved methods of adjustment. Attention is called to a new patent 36-inch band sawing machine, an improved hand planer and jointer, a surface planing machine, a six-roll planer, matcher and molder, and the Chicago No. 2 combination saw table. The latter is referred to as a "carpenter shop in itself."

The grilles manufactured by the Waddell Mfg. Company, Grand Rapids, Mich., are constructed with a view to strength and durability, as well as artistic design. They are made from three-ply stock, the outside stock crossing the center piece at right angles, and being firmly glued together insure them being straight and strong. The center stock of the grille is 1¼-inch lumber and they are carved on both sides and are made to fit any opening desired. They are shipped white, so that they can be finished with the wood work.

The American Column Company, Battle Creek, Mich., makes an offer in its advertisement in another part of this issue which is likely to interest architects and builders throughout the country. The statement is made that on receipt of a postal card saying where the writer saw this advertisement the company will send him post paid a sample section of its column showing "the wonderful lock joint." The claim is made that these columns cannot open at the joints and that they are not affected by extreme climatic changes.

The February issue of the *Cortright Metal Shingle Advocate,* published by the Cortright Metal Roofing Company, Philadelphia, Pa., is replete with interesting comments touching the merits of Cortright metal shingles and the quality of roof which results from their use. In the introductory remarks the company points out the desirability of the trade having real information relative to Cortright roofing and the place to get it is from somebody who has bought this roofing and observed its work for years. The illustrations in the February issue include the depot of the Texas & Pacific Railroad Company at Clarksville, Texas, and residences at various points, the roofs of which have been covered with Cortright metal shingles.

Plasterers' Drying Stoves are the basis of an announcement presented in our advertising columns this month by the S. M. Howes Company, 40 to 46 Union street, Boston, Mass. The stoves are made in two sizes and, while very simple in construction, are of a nature to excellently serve the purpose for which they are intended.

A notable example of the use of Dixon's Silica-Graphite paint is that of the 22-story United States Express building now in course of erection at Rector and Greenwich streets and Trinity place, New York City. The colors used in protecting the steel work are dark red and olive green, a large amount of which will be required to complete the work. In order to emphasize the fact of the use of this paint in connection with the building named the Joseph Dixon Crucible Company, Jersey City, N. J., are sending out a folded card carrying a photo-reproduction of a wash drawing of the structure, the picture measuring 7½ inches in width by 13½ inches in hight. The card is arranged with an eye, so that it may be hung up for display purposes. The architects of the building are Clinton & Russell and the contractors the Thompson-Starrett Company.

The F. J. Meyers Mfg. Company, Hamilton, Ohio, a large manufacturer of elevator cars and inclosures, shows in its advertising space this month one of its designs. The point is made that the workmanship is first class in all respects and that attention is given to bank and office grill work, window guards, ornamental wire, iron, steel and brass work of every description in any finish.

The Berger Mfg. Company, Canton, Ohio, has just made a large shipment of galvanized steel Spanish tile roofing and trimmings for a residence being erected under the supervision of W. S. Bell & Co. at Albany, Ga.

An interesting announcement regarding joist hangers and stirrups will be found in the advertisement this month of M. Lanz & Sons, Pittsburgh, Pa. In the illustration there presented the joist hanger is represented as spiked on, but shapes are also supplied for brick work, concrete blocks and for I-beams. Those who are interested can obtain descriptive matter by addressing the manufacturers.

A fire proofing material for building purposes which is composed of cement, furnace slag and other hard material and is the invention of C. F. Buente is being placed on the market by the Standard Building Construction Company, Pittsburgh, Pa. The capitalization of the company has been increased to $600,000, and in addition to the manufacture of the new material the company will turn out roofing, tile and building stone. Plans for three new buildings have been completed, these measuring 300 feet in length by 60 feet in width. It is expected to have them ready for occupancy by the middle of April, while the plants for the manufacture of the fire proofing and the roofing will be completed early in June.

Every carpenter and builder often finds it desirable to have his tools marked so as to be able when working on a job to readily identify their ownership, and interest will therefore be found in an announcement presented in another part of this issue by the Reed & Auerbacher Company, 229 Bowery, New York City. This concern is offering what is known as "Bolcoa," a well-known steel marking fluid which enables the carpenter to place his name on tools in a manner impossible to erase without destroying the article marked. It is offered at a price which brings it within the reach of all, and the method of applying it is so simple that the work can be done in a very few minutes. A leaflet which the company is sending out gives full directions for using the etching fluid.

The Baker, McMillen Company, Akron, Ohio, is sending out an attractively printed 18-page catalogue showing leading styles of the Akron and Standard Eclipse levels. All glasses in these levels are carried on elastic bearings and inclosed in a heavy glass tube specially made for the company, which when placed in the wood is said to be almost unbreakable. It is also pointed out that these levels are so constructed as to endure the falls and jars incident to daily use without injury and that they have a clear, distinct eclipse band to divide the bulb, which is easily seen even at a considerable distance. There are two plumbs in the level, so that the stock can be applied either end. The adjustment of the leveling glasses is obtained by moving the glass from the right to the left until correct, and then when correct the screws are tightened. In the plumb glasses the adjustment is obtained by tightening one of the screws at the top, but loosening neither. In the catalogue before us the various styles of levels are printed in colors indicating as nearly as possible the actual appearance of the finished instruments.

The J. A. Fay & Egan Company, 221 to 241 West Front street, Cincinnati, Ohio, are favoring their friends in the trade with a poster calendar for the new year. It is bound at top and bottom with metal strips and has a metal loop by which it may be suspended upon the wall. The central feature is an oval panel carrying a bird's-eye view of the company's plant, which is referred to as "the largest factory in the world making wood cutting machinery." The frame of the panel is a gilt band carrying the names of expositions at which the company has been awarded medals, and *fac-similes* of some of them are worked in as a part of the frame. The leaves forming the calendar for the year are attached to the lower portion of the poster and in addition to the days of the week and month give the phases of the moon.

Morse, Williams & Co., Philadelphia, Pa., call attention in their advertising card this month to the Morse hand elevators and dumb waiters which are referred to as safe, easy running and durable. They are shipped complete, with or without lumber, and with drawings and instructions for erecting. Those who have occasion to make use of goods of this character will be interested in the literature which the company has issued relating to its product.

The Chicago Metal Covering Company, 137 to 139 Fulton street, Chicago, Ill., shows in a 20-page catalogue which has been issued from the press various styles and sizes of metal covered moldings which are regularly manufactured and carried in stock. The statement is made that should any special sizes or styles be desired the company will give to them the same careful attention that it gives to its regular line. In the catalogue each design is numbered so as to facilitate ordering and to avoid any possibility of misunderstanding on the part of the manufacturer as to what is wanted. Reference is made to glass sign metal moldings, show case moldings and to a solid metal stair and carpet protector which is intended to cover the part that wears out first. The moldings turned out by the company are made in German silver, brass, copper, gold bronze, oxidized black and antique copper.

The Ideal Concrete Machinery Company, South Bend, Ind., reports a growing demand from foreign countries for its machines. Six machines have just been shipped to Manila, P. I., and a voluntary order was recently received from the engineer's office of the Government of the Moro Province for a machine with complete outfit of accessories and attachments. This machine is to be used for making blocks for the Provincial Building to be erected at Zamboanga, Island of Mindanao. The Ideal Company also recently made a shipment to Liverpool, England, and is in receipt of inquiries from Australia, New Zealand, Cuba, South America and South Africa.

The New Year's issue of *The Arrow,* published monthly by the N. & G. Taylor Company, Philadelphia, Pa., has much that is timely and amusing regarding "Taylor Old Style" tin. Rufus, the Roofer, comments in his quaint style upon New Year's resolutions, and in addition there are some old style fables with modern applications.

Wood Carvings

Hand and Machine Carvings, Mouldings, Festoons, Newel Posts, Head Blocks, Rope and Twist Balusters and Ornaments. We also make a specialty of Fine Staved Up Quartered Oak and Birch Columns for Interior Work.

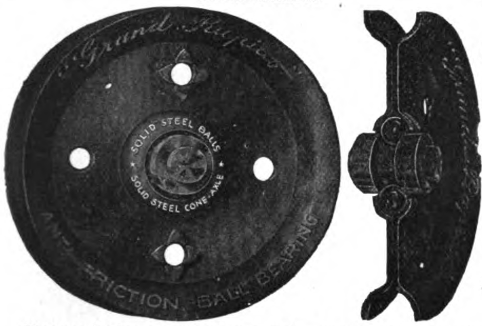
Almost 1,500 designs illustrated in our New Catalogue and Price-List No. 20. Mailed for 15c. in stamps.

Waddell Mfg. Co.,

Corner Taylor and Coldbrook Sts.,
GRAND RAPIDS, MICH., U. S. A.

No. 0575.

Patent Pending.



"Ball-Bearing" Grand Rapids All-Steel Sash Pulleys

Are sold DIRECT to
BUILDERS,
CONTRACTORS
and MILLS,

At prices under the common ordinary goods.

If you make ten or ten thousand window frames, we can save you money and give you a superior sash pulley. We are the largest sash-pulley makers in the world. We ship direct, or through dealers and jobbers everywhere.

Write for catalogue and free samples and prices on half-gross, gross, barrel or any quantity.

Direct from the Makers to you. Inquiries welcome.

GRAND RAPIDS HARDWARE CO.,

3 PEARL STREET, - - - GRAND RAPIDS MICH.

THOMAS MORTON,

169 Elm Street, New York.

Copper Cable, Champion Metal,
Steel Cable, Steel Champion,

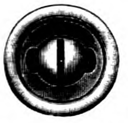
SASH CHAINS.

CHAINS

For Suspending Heavy Doors, Gates, etc.
All of SUPERIOR QUALITY.

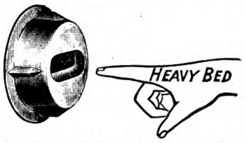
THE IVES' PATENT WINDOW STOP ADJUSTER

PATENTED



FOR WINDOWS AND SLIDING DOORS

Insures Protection against Cold Draughts, Dust, Rattling or Binding.



The that only Window Stop Adjuster made from one piece of metal that has a heavy bed will not bend or cup in tightening the screw.

THE H. B. IVES CO.

40 Page Catalog mailed free. New Haven, Conn., U. S. A.

No. 225—48x12 inches, **$3.60.** Retail value, $7.00.
No. 230—48x14 inches, with Curtain Pole, **$4.50.** Retail value, $9.00.
Others from $2.50 up. Largest assortment. Division Screens and special Grilles to order.

Grilles "Direct from Factory" Mantels

TILE of Every Description, for Walls and Floors. Ceramic Mosaic-Enamels, etc.

$13.25 buys this solid oak Mantel, 80 in. high, 51 or 60 inches wide, 28 x 16 Mirror. Heavy columns and elaborate capitals. Tile facing and hearth. Plated Club House Grate, $10.00.

Write for catalog of Mantels, Grates, Tiles for floors and baths, Slate Laundry Tubs, Grilles, etc. It is free. Or send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from **$12** to **$200.**

W. H. OSTENDORF,
2417 N. Broad St., Philadelphia, Pa.

Going to Build?

OUR CATALOGUE #25 WITH PLANS AND PLATES TELLS YOU ALL ABOUT IT. 800 PAGES, 6000 DESIGNS.

SEND 20¢ **FREE** FOR POSTAGE

THE FOSTER-MUNGER CO., CHICAGO, U.S.A.

HARDWOOD VENEERED DOORS, ART GLASS, BLINDS, COLONIAL COLUMNS, PORCH WORK, SASH, ETC.

GRILLES, MANTELS, STAIRS, WOOD-CARPET.

COLONIAL COLUMNS

ANY SIZE OR DESIGN

JOINTS DON'T OPEN

AMERICAN COLUMN CO. LTD.
BATTLE CREEK MICH.

CATALOG FREE

Anyone May Have This Book

...IT'S... FREE

Write us now while you think of it

The most complete and practical book on "beautifying the home" ever written. Worth $25.00 or more to home lovers.

Elegant new edition. Far excels the 950.000 copies of previous editions.

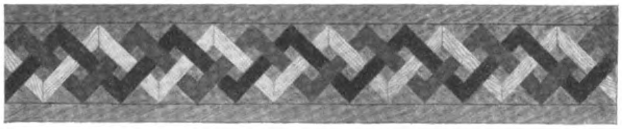
Write at once for above book, "The Proper Treatment for Floors, Woodwork, and Furniture," and learn how easily and inexpensively you can beautify your home. Tells all about wood, wood finishing, wood cleaning and wood polishing for the home. How to finish pine to look like beautiful hardwood—how to produce all the latest finishes and the cost. Sent free by the manufacturers of

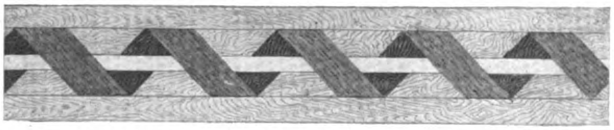
Johnson's Prepared Wax

"A Complete Finish and Polish for All Wood"

Unequaled for Floors, Furniture and Woodwork

It produces a lasting and artistic finish to which dust and dirt will not adhere. It preserves and beautifies. Will not crack, blister, peel off or show laps. Heel marks and scratches will not show. Because Johnson's Wax contains more polishing wax, and of the best quality, to the pound than any other, it produces the best, most lasting, sanitary finish and polish with the least effort. That is why it is the largest selling wax in the world. Fine for preserving and polishing oil-cloth and linoleum. Try it.





SPECIAL. We are large manufacturers of ornamental hardwood floors and will be pleased to send you upon request our free catalogue, showing many beautiful and new designs. Hardwood floors are far ahead of other floors ---they are sanitary, durable, attractive and in demand. Don't delay---write us to-day. We carry a large stock and can ship promptly, anywhere.

This Mitt FREE

Read Our Offer

Johnson's Polishing Mitt, our latest device for polishing furniture and woodwork with our wax. Made of sheepskin with wool on, is open across the back and slips on hand. Sent FREE for label from one pound or larger can of Johnson's Prepared Wax. Remove label by placing can in steam or hot water.

Johnson's Prepared Wax is **sold by all dealers in paint**—½ lb. can, 30 cents; 1 and 2 lb. cans, 60 cents per pound; 4, 5 and 8 lb. cans, 50 cents per pound.

Write to-day for book and mention edition C.B. 3. Don't forget the label, either.

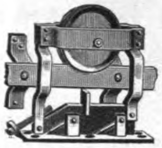
S. C. Johnson & Son

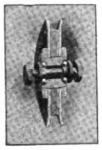
Racine, Wis.

"The Wood-Finishing Authorities"

"LANE'S BALL BEARING"

Is the best House Door Hanger made.





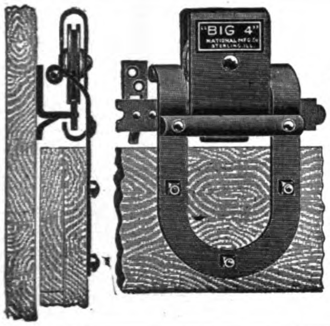
Has an ALL steel frame.

Cups, Cones and Balls are of the same material, made and hardened by similar processes as best bicycle parts.

Sold by the hardware trade. Send for circulars to

LANE BROTHERS CO.,

423-455 Prospect St., - POUGHKEEPSIE, N. Y.



"BIG 4"
FLEXIBLE DOOR HANGER.

Anti-Friction. Cannot Jump the Track.
Exclusive Sale Given.

NATIONAL MFG. CO.,
STERLING, ILL.

Carpenters and Builders, Attention

Our large catalogue is now ready to be sent to you. If your name is not on our mailing list ask us for this book.

This is the most complete SASH and DOOR catalogue with *net prices* ever published.

The Carpenter who uses our prices in figuring his work will surely get the job.

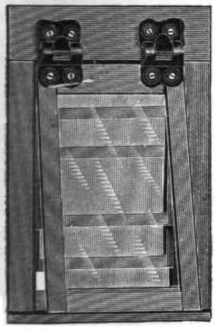
Write to-day. Don't put off.

SCHALLER-HOERR COMPANY,
CHICAGO, ILL.

Grand Rapids Wood Carving Co.,

GRAND RAPIDS, MICH.

Catalogue on application.



Full-length window screens keep out all the flies and protect the windows. Screens attached with

GOSSETT'S
Detachable Suspension
HINGES

are easily put up or removed—no tools or ladder necessary. Write for free sample pair. Price per Doz. pairs $1.20 (Express paid),

Sold by Hardware and Lumber Dealers.

Manufactured by

F. D. KEES MFG. CO. Beatrice, Nebr.

The Ideal Ventilator

10 Reasons Why

This ventilator is the ideal one in fact as well as in name are given in our catalogue. When you read them you will understand why so many are being sold.

SEND FOR CATALOGUE.

Ideal Ventilator Company,
340 Weybosset St.,
PROVIDENCE, R. I.

Branches: Boston Philadelphia New York

AGENTS WANTED.

King's Automatic Weather Strip. Window and Door Stop.

The only perfectly satisfactory weather strip, window and door stop on the market.

Keeps out cold and dust.

Makes a perfectly tight joint.

Windows can be raised and lowered to desired position without the use of fasteners or of weights.

Do not build a house until you have investigated the merits of these strips.

Write for prices.

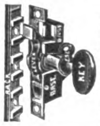
MANUFACTURED BY
The King Manufacturing Co.
Newton, Ia.

GRINDSTONES.

Mounted Grindstones for Carpenters' or Anybody's Use.

THE CLEVELAND STONE CO.,
6th Floor, Hickox Bldg CLEVELAND, O.

HUBBARD'S WINDOW SASH LOCK



Not merely a catch but a lock. Stops burglars, rattling sash, wind and rain. It does all this and is out of sight. Safe for ventilation, etc.

$3.00 Per doz. 25c. Each

Liberal offer. Canvassers wanted.

For terms, circulars, etc. apply to

D. S. HUBBARD, SON & CO.
259 Third Ave., Bay Shore, N. Y.

FURNACE HEATING.

By William G. Snow

With an Appendix on Furnace Fittings.

170 Pages; 90 Illustrations; Size, 6 x 9 inches. Cloth bound. Price, $1.50.

DAVID WILLIAMS CO.
14-16 Park Place. New York.

LORENZEN MANTELS

AND GRILLES

Also contractors for Ceramic Mosaic and Tiles, Interior and Decorative Marbles, also manufacturers of Improved Scagliola for Bathrooms, Vestibules and Interior of Lobbies and Corridors in Banks, Libraries, Hotels and Public Buildings.

To Carpenters and Builders. FREE.

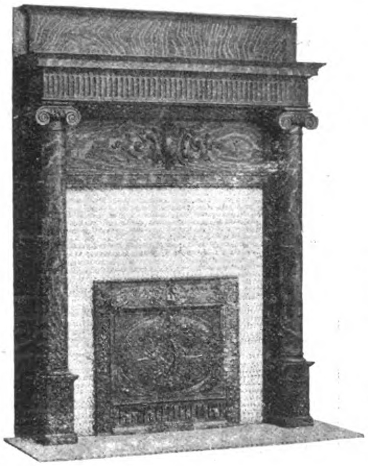
We will mail our large, handsome 96 Page (10 x 12) Catalogue, the largest Mantel and Grille book ever published, which costs us nearly 50 cents. Send us your business card and we will show you a way to make money by becoming our sales agent for your territory.

Write To-day.

CHAS. F. LORENZEN & CO., Inc.
253 North Ashland Ave., Chicago.

We have just shipped a carload of our Mantels and Interior Finish to the United States Legation Buildings, Pekin, China.

LORENZEN PAYS THE FREIGHT



THE AWB CO.

YOU'RE SAFE

IN ORDERING FROM OUR CATALOGUE

We know you will be pleased with the

BURRITT MANTELS

Because They're RIGHT in FINISH WORKMANSHIP PRICE

Send us your order. The goods speak for themselves.

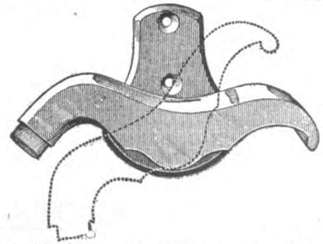
Write TO-DAY for our Catalogue. It's FREE.

THE A. W. BURRITT CO., **400 Knowlton Street**
"THE MANTEL FOLKS," **BRIDGEPORT, CONN.**

THE AWB CO.

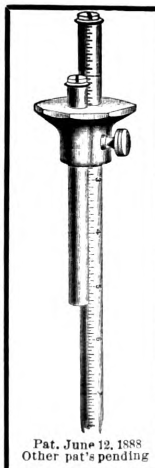
EMPIRE DOOR HOLDER

IMPROVED



Holds the heaviest doors on polished floors. 50% greater pressure than any other. Easy to put on, easy to use; the toe operates it. Write for circulars to

CALDWELL MFG. CO.,
5 Jones Street, Rochester, N. Y.



Pat. June 12, 1888
Other pat's pending

Barrett's Improved Combination Roller Gauge

Appeals to all practical carpenters. It is quickly adjusted with only one screw, direct from the centre, fastening both beams in their proper place. A simple device holds the beams in position while being adjusted. It is accurately made and finely finished. One trial will convince any carpenter of its many advantages over all others. Insist upon having the Improved Style, adjusted by one screw.

The Leavitt Machine Co.,
Sole Manufacturers,
Orange, Mass., U.S.A.

THE FORBES FURNACE

You run no risk in putting in the Forbes Furnace.

Every one guaranteed if properly installed. No sheet iron drums—entirely cast iron radiating tubes ½ inch thick. Will wear for years.
Send for new catalogue and full particulars.

TUBULAR HEATING AND VENTILATING CO.
228 QUARRY ST., PHILADELPHIA PA.

MANTEL TYPE
to fit ordinary fire place.

HEAT
When and Where You Want It

Garwood Heaters
Steam and Gas Combined

No Flue Required. No Odor. Atmosphere kept normal. Burn no more Gas than two ordinary Illuminating Burners. Change a Cold Room to a Comfortable One. Send for Catalogue

The Frank C. McLain Co.
900 So. Cleveland Ave., Canton, Ohio

PORTABLE TYPE
to set anywhere
in room.

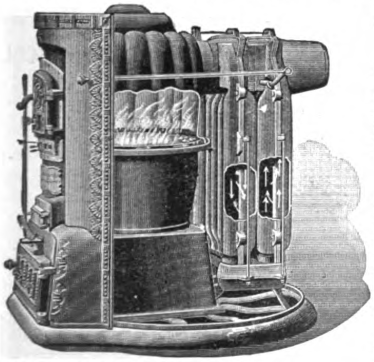
Isn't It Reasonable

that a company which has served two generations knows more about heating apparatus than some experimental theorist? Our knowledge is grounded in experience.

INSIST that all Furnaces and Boilers are marked "made by the

INTERNATIONAL HEATER CO.,"
UTICA, N. Y.
New York. Boston. Chicago.

THE BEST IS THE CHEAPEST



The BENGAL FURNACE

has stood the crucial tests imposed upon it in various places and always came out the victor.

The best evidence of its superiority is that imitators are trying to sell their wares on the merits of the BENGAL, saying it is "just as good."

There are none "just as good."

Full particulars on application.

THE FLOYD-WELLS CO., - Royersford, Pa., U. S. A.

LEADER
Steel Furnace $49

Our No. 45 Steel Furnace, without pipes or registers, we send anywhere, freight prepaid east of Omaha, for $49. You can't match it in your town for any such money. It will heat a house of 7 or 8 rooms, store, school or small church. Has steel body with riveted and lined galvanized iron casing. Has brick fire box. Regulated by chains. Burns soft or hard coal, wood or coke. Any man can set it up successfully, putting pipes, registers and smoke pipe in proper positions from our clear detailed descriptions. Don't pay others for what you can do as well yourself. Write for our instructive book, "Modern Furnace Heating," a 40-page book on the science of heating a house. It warns you what to avoid and how to benefit by the mistakes of others. Every house owner should have it. It's valuable. Send for it now. It's free.

Hess Warming & Ventilating Company,
709 Tacoma Building, Chicago, Illinois.

All Manner of Handy Rules for the Estimator are given in . . .

HODGSON'S

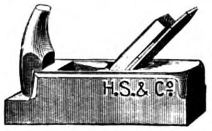
Estimating Frame and Brick Houses

ONE DOLLAR, POSTPAID.

DAVID WILLIAMS CO., 232-238 William Street, N.Y.

IMPORTED BENCH PLANES

Extra Quality German White Beech, Hand Made, With Buck Bros. Irons



Horn Smooth

Horn Shrup

No. 401. Double Horn, Smooth, with either 1 7-8, 2, or 2 1-2 inch Iron. } **$1.00 Each** f. o. b. New York

No. 402. Single Horn, Shrup, with either 1 1-4, 1 3-8 or 1 1-2 inch Round Nose Iron. } **65 cents Each** f. o. b. New York

To those who prefer wood planes we recommend very highly the German *genuine* White Beech Planes. For wearing qualities they compare very favorably with the more expensive boxwood planes. We offer, for a limited time only, a small quantity at above prices. (They are too heavy to be sent by mail.)

HAMMACHER, SCHLEMMER & CO.,

HARDWARE, TOOLS, SUPPLIES and PIANO MATERIALS

NEW YORK SINCE 1848.

4th AVE. & 13th ST. (BLOCK SOUTH OF UNION SQUARE.)

"Forstner" Brace and Machine Bits

For Fine Carpenter, Cabinet and Pattern Work

Specially Adapted for Hardwood Working.

The Forstner Labor-Saving Auger Bit, unlike other bits is guided by its *Circular Rim* instead of its centre; consequently it will bore any arc of a circle and can be guided in any direction regardless of grain or knots, leaving a true polished surface. It is preferable and more expeditious than chisel, gouge, scroll-saw, or lathe tool combined, for core-boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon moulding and mortising, etc.

To introduce this high grade tool among carpenters, pattern makers, and others, we will mail to any reader of "Carpentry and Building," upon receipt of 50c., any bit we make from ¼ inch to 1 inch in size.

Manufactured by

The Progressive Mfg. Co., Dept. "A", Torrington, Conn.

Enquire of your Hardware Dealers or write us direct. Supplied in Sets. Write for Catalogue.

The man who is interested in any branch of wood finishing should have

The Modern Wood Finisher

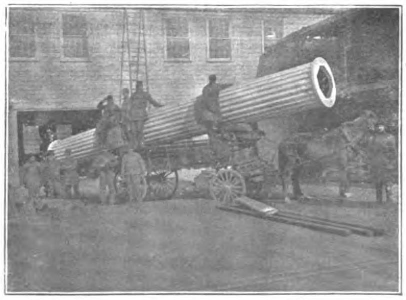
By F. Maire.

Contains well-tested, reliable information on woods and their treatment-

A Book of 159 Pages.
Fifty Cents, Postpaid.

DAVID WILLIAMS COMPANY

14-16 Park Place, New York



THE LARGEST LOCK JOINT COLUMN EVER BUILT.

40½" in diameter, 33-10 in. long.

One of four furnished by us for the Portico of the Allenhurst Club, Allenhurst, N. J.

HARTMANN BROS. MFG. CO.

Mt. Vernon, N. Y., U. S. A.
New York Office: **1123 Broadway.**
Also
Henry Sanders Co., **Chicago, Ill.**
A. J. Koll Planing Mill Co.,
Los Angeles, Cal.

MANUFACTURERS OF

KOLL'S PATENT LOCK JOINT COLUMNS FOR PERGOLAS, PORCHES OR INTERIOR USE. Send for Catalogue D 19.

FAR AHEAD for smooth, easy work and holding edge, will be YOUR VERDICT ON TRYING

CHAPLIN'S IMPROVED PLANES

Patented Feb. 14, 1899; Oct. 30, 1900; Dec. 24, 1902.

We want you to have a copy of our booklet, just issued,

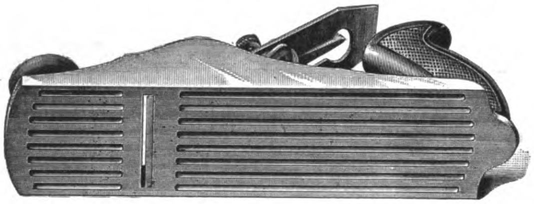
"A 'PLANE' TALK ABOUT A GOOD PLANE!"

We want you to have a copy, for it is a booklet you really need in your business. We'll gladly send you this booklet with our compliments, promptly upon receipt of your request.

May we send you a copy?

TOWER & LYON COMPANY,
95 CHAMBERS STREET, NEW YORK.

We Invite the

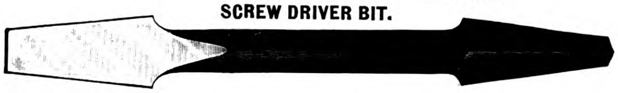


Severest Comparative Tests.

DEMAND and be sure to get

THE VICTOR

SCREW DRIVER BIT.



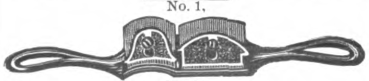
It is the Best that money can buy. Each one carefully hardened and tempered by itself. Examined, Tested and *Guaranteed Perfect.*

Drop Forged in assorted sizes.

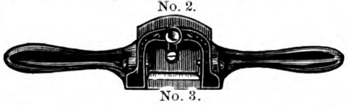
KRAEUTER & CO.,
NEWARK, N. J.

SPOKE SHAVES.

No. 1.



No. 2.



No. 3.

HARGRAVE

HARGRAVE'S TOOLS

BEST { QUALITY. FINISH. DESIGN.

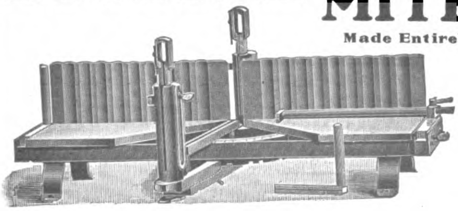
SPECIFY THESE GOODS TO YOUR DEALER, **TAKE NO OTHER.**

WRITE FOR CATALOG NO. 200.

THE CINCINNATI TOOL CO.,
Norwood CINCINNATI, OHIO.

GOODELL MITRE BOX

Made Entirely **OF STEEL.**



No More Breaking.

Most desirable Box on the market, being way ahead in quality and improvements.

Send for Folder.

GOODELL MFG. CO.,
GREENFIELD, MASS.

As plank frame barns are more extensively erected the builder will find of increasing usefulness a copy of the book

Plank Frame Barn Construction

By JOHN L. SHAWVER

Presents a complete system of framing which combines economy with advantageous features of construction.

ILLUSTRATED.
CLOTH BOUND.

Fifty Cents, Postpaid.

DAVID WILLIAMS COMPANY
14-16 Park Place, NEW YORK

We Don't Mean to Boast And Really We Don't Have To.

Below is a sort of condensation of many unsolicited opinions from almost every country on earth:

"The most complete work on Wood Working Machinery, Tools and Supplies ever published."

"A recognized authority on Metal Working Tools, Machinery and Supplies."

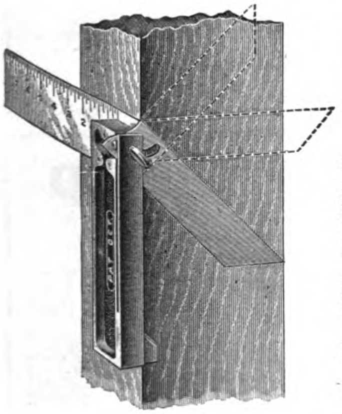
Send 25 cents for either of these books to

The CHAS. A. STRELINGER CO.,

Publishers of the Catalogues and Suppliers of the best of everything in Tools, Machinery and Supplies.

Box B. **DETROIT, MICH., U. S. A.**

SOMETHING NEW

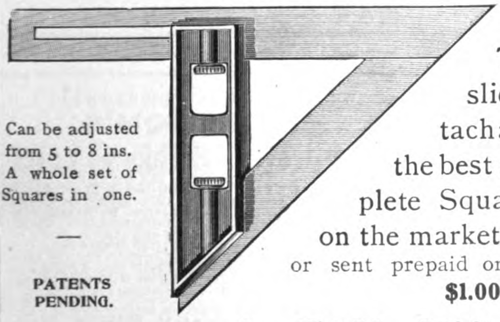


Ideal Bevel Try Square

By having this combination try square you save time, also the price of one tool. You can see by cut how easy it is to change the bevel blade to any desired position to make the square and bevel cut with one stroke of the pencil.

NICHOLLS MFG. CO., OTTUMWA, IOWA.

The Fox Square and Miter Improved



This tool with sliding and detachable blades is the best and most complete Square and Miter on the market. Of your dealer or sent prepaid on receipt of price, **$1.00.**

Can be adjusted from 5 to 8 ins. A whole set of Squares in one.

PATENTS PENDING.

P. L. FOX, M'f'r,

432 William Street - - BRIDGEPORT, CONN.

Key to the Steel Square

It is a wonderful instructor. It instantly gives the figures to use on the common steel square for the lengths, cuts and bevels for all rafters. It also gives the figures to use for all polygonal miters, hopper cuts, etc. Size, three inches in diameter, complete with book of instruction, all in morocco case suitable for the pocket. Can be consulted at a moment's notice.

Price, post paid, $1.50

Send express or money order to

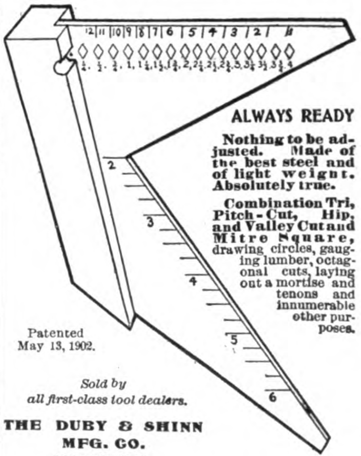
ALFRED W. WOODS

109 So. Tenth St. **Lincoln, Neb.**

New Universal Square.

Made in Three Sizes

No. 1	**6 inches**	-	**$0.65**
No. 2	**10 inches**	-	**1.00**
No. 3	**13 inches**	-	**1.50**



ALWAYS READY

Nothing to be adjusted. Made of the best steel and of light weight. Absolutely true.

Combination Tri, Pitch-Cut, Hip, and Valley Cut and Mitre Square, drawing circles, gauging lumber, octagonal cuts, laying out a mortise and tenons and innumerable other purposes.

Patented May 13, 1902.

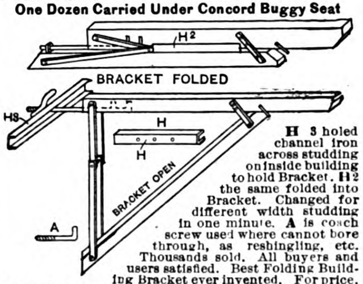
Sold by all first-class tool dealers.

THE DUBY & SHINN MFG. CO.
INCORPORATED

Nelson Bldg. **19 Park Place** **New York City**

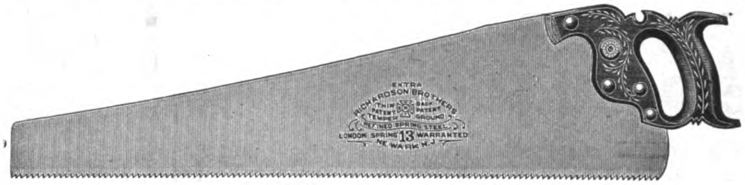
FOLDING BUILDING BRACKET (Patented)

One Dozen Carried Under Concord Buggy Seat



H 3 holed channel iron across studding on inside building to hold Bracket. **H2** the same folded into Bracket. Changed for different width studding in one minute. **A** is coach screw used where cannot bore through, as reshingling, etc. Thousands sold. All buyers and users satisfied. Best Folding Building Bracket ever invented. For price, particulars, etc., write **A. H. Danforth,** Monson, Mass.

OLD RELIABLE RICHARDSON SAWS.



ESTABLISHED 1860.

The peer of them all. Try one and be convinced. Every saw fully warranted.

NATIONAL SAW CO. Operating Richardson Bros. **NEWARK, N. J.**

SAWS

Bring trade and hold it—Our advertising brings it to you—Our perfect product brings it back again—**ATKINS SILVER STEEL HAND AND CROSS-CUT SAWS** are safe to buy and safe to sell—They're guaranteed—1906 Catalogue and Discount Sheet on application.

E. C. ATKINS & CO., Inc.,

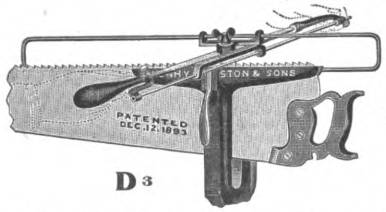
Factories and Home Office, INDIANAPOLIS.

BRANCHES: Atlanta, Chicago, Memphis, Minneapolis, New Orleans, New York City, Portland, San Francisco, Seattle, and Toronto, Canada.

DISSTON Filing Guide and Clamp.

Especially Designed to assist those not skilled in the art to file a saw correctly.

IT'S PRACTICAL SEND FOR DESCRIPTIVE CIRCULAR.



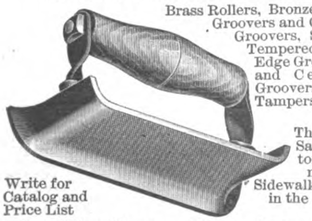
THIS GUIDE IS FITTED TO THE DISSTON Nos. 2 and 3 CLAMPS.

HENRY DISSTON & SONS, INC.,

KEYSTONE SAW, TOOL, STEEL & FILE WORKS,

PHILADELPHIA, PA.

Try "Best" Spring Tempered Steel Edge Groovers and Center Groovers



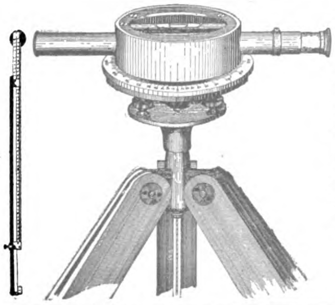
Brass Rollers, Bronze Edge Groovers and Center Groovers, Spring Tempered Steel Edge Groovers and Center Groovers, Iron Tampers, etc.

The Most Satisfactory Cement Sidewalk Tools in the World

Write for Catalog and Price List

The Woodhouse Hdw. Mfg. Co.

2620 So. 13th St., St. Louis, Mo.



WHAT BUILDERS HAVE BEEN LOOKING FOR

BOSTROM'S Improved Builders' Level

An absolutely reliable leveling instrument for Architects, Builders, Carpenters, and Stone Masons. Can be used for any kind of foundation work and getting angles, is simple in its construction, easily understood, and can be operated by any one. Is made of Brass, oxidized, and has a silvered circle of degrees. Has achromatic Telescope of ample power for such work. Price, including Plumb Bob, Tripod and Graduated Rod and Target, $20.00. Write for circular and be convinced. Every instrument guaranteed.

BOSTROM-BRADY M'F'G CO.,

53½ West Alabama Street,

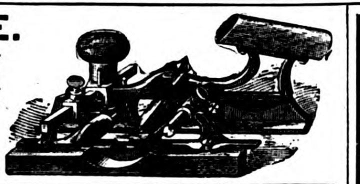
Atlanta, Ga.

FALE'S PAT. PLANE.

Constituting Carpenter Plow, Dado, Filletster, Matching Sash, Hollows, Rounds, Beads, Rabbets, Nosings, Case Mouldings, Quarter Rounds, &c. The most Compact and Serviceable Tool ever invented. Universally endorsed by carpenters.

AGENTS WANTED.

OTIS A. SMITH, Sole Mfr., Rockfall, Conn.



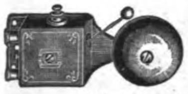
An Instant Cure For Slipping Belts!

DIXON'S SOLID BELT DRESSING.

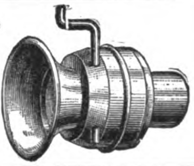
WRITE FOR A FREE SAMPLE.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

W. R. OSTRANDER & CO., 22 Dey Street, New York City,



Manufacturers of
Speaking Tubes, Whistles, Elevator,
House and Hotel Annunciators and Bells,
Electric Light Supplies.
Send for Catalogue.



Factory, 1431-1439 DeKalb Avenue, Brooklyn.

"Yankee" Tools.

No. 41—AUTOMATIC DRILL.

No. 42—AUTOMATIC DRILL.

No. 50—RECIPROCATING DRILL FOR WOOD OR METALS.

The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up to date mechanic could buy tools of their quality and character. Other tools are very good tools, but "Yankee" Tools are better. "Yankee" Tools are sold by all leading dealers in Tools and Hardware. Ask your dealer to see them. Our Yankee Tool Book tells all about them. Sent free by

NORTH BROS. MFG. CO., Philadelphia, Pa.

A TOOL THAT'S STAMPED
STANLEY
IS THE BEST OF IT'S KIND

IMPROVED CARPENTERS' TOOLS

Sold by all Hardware Dealers

Stanley Rule and Level Co.
NEW BRITAIN, CONN., U. S. A.

A COMPLETE FRAMING RULE
ON
NICHOLLS FRAMING SQUARE.

On the square is where the carpenter wants his figures, not in a book or on a piece of paper, as they are usually lost.

NICHOLLS MFG. CO.,
OTTUMWA, IOWA.

We have now ready our New Illustrated Catalogue No. 19 devoted exclusively to

Wood Workers' Tools

Containing **250** pages, **1100** illustrations, handsomely printed on good paper, it makes a convenient and valuable book for **all woodworking mechanics.**

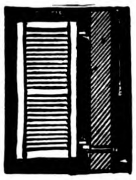
Sent to any address on receipt of 10 cents postage.

WM. P. WALTER'S SONS,
TOOL HEADQUARTERS
1233 Market St., Philadelphia.

Mallory Shutter Worker.

Works and locks the blinds from the inside. Ornamental, durable, perfect working. Applicable to old or new buildings.

Manufactured by
MALLORY MFG. CO.,
Flemington, N. J.



Automatic Blind Hinges

HALE & BENJAMIN'S PATENT

Flush and surface for wood and brick building. Easy to put on, strong and durable. **Warranted.** Also combination awning hinges. With these hinges blinds will not slam or blow off. They are the only hinges adapted to bay or mullion windows, as they require no other fixtures. Testimonials on request from dealers, contractors, and people who have used them several years. We are the sole owners of these two patents. If your dealer does not keep them write to

PARKER WIRE GOODS COMPANY,
Manufacturers,
No. 1 Assonet Street, Worcester, Mass.

Use Our
Folding and Adjustable
Handle Draw Knife!

It is adjustable to any position, adaptable to the awkward places, absolutely rigid when set, handy and compact, a time saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

Write for Prices and Discounts.

A. J. WILKINSON & CO.,
180-188 Washington St., Boston, Mass., U.S.A.

The Rich Handy Drawing Outfit

Saves Time

for the draughtsman, and is a great aid to the learner. It holds a number of sheets or a pad, which requires no fastenings. The Protractor T Square gives accurate angles. You get measurements direct from the board. Has a drawer for instruments, and can be carried around to make drawings on the spot. Circulars free.

J. & G. RICH, 122 N. 6th St., Phila., Pa.

Send for Catalogue No. 62

Giving description of books on Architecture, Building, Engineering and allied subjects. Sample of "Architects & Builders Magazine" sent on request.

Published monthly at $2.00 a year.
Foreign Subscriptions, $3.00 a year.

WM. T. COMSTOCK, Pub., 23 Warren Street, N.Y.

SHOW WINDOWS

ought to be well lighted, if at all. Not a single objection can be raised against the Frink System of show window lighting. The Best Stores use it.

I. P. FRINK, 551 Pearl St., New York.

A 7½ HAND SAW

This is not a PRIZE but a JEWEL. If your dealer cannot furnish you one of our CELEBRATED NARROW A 7½ HAND SAW, 6 inch at butt, 1⅛ inch at point, 4 gauges thin on back, send us P. O. Order for $2.00 and we will send, express prepaid, 26 inch SAW in Canvas Scabbard.

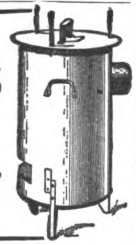
C. E. JENNINGS & CO.,
101 Reade Street, NEW YORK.
SOLE MANUFACTURERS.

Plasterer's

DRYING STOVES

2 sizes
Send for price.

The S. M. Howes Co.,
40-46 Union St.
BOSTON, MASS.



STANDARD FOR 30 YEARS

This name stamped on every three feet is a guarantee that you are getting the best sash cord that can be made.

SILVER LAKE CO.,
Boston, Mass.

CLARK'S EXPANSIVE BIT

48c.

This well-known Expansive Bit has made for itself a reputation that is second to none. Made from the highest grade tool steel, finely polished and finished; carefully tested and fully guaranteed. Each bit is complete with two cutters and is adjustable to cut intermediate sizes from ⅛ inch to 1⅛ inches.

We Manufacture the Cclebrated Wivanco Tools

If you have not used them, do it now and you will be surprised at the saving in cost and the satisfaction derived from using tools of high quality.

Our New 600 Page Catalog No. 90

Will give you full description and prices of the different sizes of this bit together with the extra cutters, also a full description of our complete line of tools, work benches, &c.

Write for it to-day. PRICES LOWER THAN EVER.

Express and freight rates are cheaper from New York than any other city in America.

Oldest Mail Order House in America. Established 18 6.

White, Van Glahn & Co.
14 CHATHAM SQUARE, NEW YORK CITY

TAINTOR
Positive Saw Set

TRY IT If you like it tell others
If you don't like it tell US

Send for our circular which contains HINTS on the

CARE of SAWS

Free on application.

TAINTOR MFG. CO.
113 Chambers St., New York

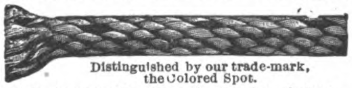
MONARCH
Sash Chain

IS THE BEST.

Samples free. Mention this paper.

The Bridgeport Chain Co.
Bridgeport, Conn.

SAMSON SPOT CORD



Distinguished by our trade-mark, the Colored Spot.

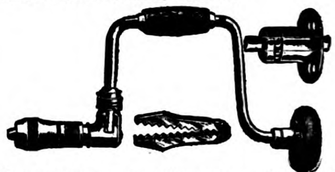
Outwears any other device for hanging windows.

SAMSON CORDAGE WORKS, Boston, Mass.

Ask for MILLERS FALLS CO.'S BIT BRACES

Series Nos.	30	31	32	33
	14	12	10	8 inch sweep.

There are no other braces made which match them in merit and beauty of finish.



Our name appears on all genuine goods. Look for it before you buy. If your dealer does not keep Millers Falls Braces then write to us.

Millers Falls Company
28 Warren Street, New York, N. Y.

THE FORD AUGER BIT

FORD AUGER BIT CO., Holyoke, Mass.

The first and only Bit with Patented Concave Twist. The best Bit for all round work yet produced. It is worth your time to try one and see.

BURLINGTON
VENETIAN BLIND CO.
MAKERS OF
BLINDS
AND SCREENS
BURLINGTON, VT.

Starrett Universal Scraper

No. 194. Of all the tools which we have brought out in recent years none has met the instant approval of both mechanics and dealers so completely and unanimously as this scraper. It has all edges ground perfectly square, which by using both sides gives it eight sharp cutting edges, any one of which can almost instantly be brought into use by means of the ball joint connecting handle. By a slight turn of same the ball joint is frictionally locked or released, or placed at any angle desired to get into corners and to tip the scraper blade so as to give the most effective cut.

The guard, which may be instantly slipped off and on either end or side of the blade, together with the finely shaped handle, enables one to use it with a strong, firm grip, bearing on either heavily or lightly to effect the best results. In fact, it is the neatest, simplest and best scraper in its line ever made for use on floors, benches, meat blocks, etc.

Send for free Catalogue No. 17 P of Fine Mechanical Tools.

The L. S. Starrett Company,
ATHOL, MASS., U. S. A.

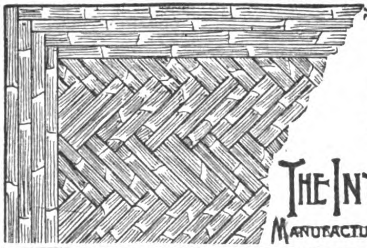
Price, prepaid, 75c.

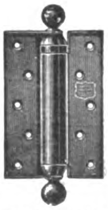
Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

VOL. XXVIII. NO. 4. NEW YORK, APRIL, 1906. Ten Cents a Copy. One Dollar a Year.





Alphabetical List of Advertisers.

American Column Co	57
American Rolling Mill Co	10
American School of Correspondence	10,62&6
American Wood Working Machinery Co	6
Asphalt Ready Roofing Co	1
Atkins, E. C. & Co	66
Baker McMillen Co	63
Barnes, W. F. & John Co	4
Barnes Tool Co	8
Barnett, G. & H., Co	1
Batavia Clamp Co	59
Berger Mfg. Co	9
Bommer Bros	1
Boston Bolt Co	12
Bostrom-Brady Mfg. Co	66
Boynton Furnace Co	16
Bracket Hook Co	9
Bridgeport Chain Co	68
Broad Gauge Iron Stall Wks	63
Burlington Venetian Blind Co.	68
Burnham, Hitchings, Pierson Co	11
Burritt, A. W. Co	60
Cabot, Samuel	1
Caldwell Mfg. Co	60
Canton Steel Roofing Co	10
Cement Machinery Co	8
Champion Safety Lock Co	58
Chattanooga Roofing & Fdy. Co.	51
Chicago House Wrecking Co.	3
Chicago Machinery Exchange	7
Cincinnati Tool Co	64
Cleveland Stone Co	59
Columbia Mineral Wool Co.	16
Comstock, Wm. T	68
Cordesman, Meyer & Co	9
Cortright Metal Rfg. Co	12
Crescent Machine Co	8
Davis & Cook	63
Diamond Expansion Bolt Co	8
Disston, Henry & Sons	66
Dixon, Jos., Crucible Co	67
Drouve, G. Co	10
Duby & Shinn	65
Eastern Granite Roofing Co	13
Edwards Mfg. Co	9
Eller Mfg. Co	13
Energy Elevator Co	15
Enterprise Fdry. Co	7
Fay, J. A. & Egan Co	5
Floyd, Wells Co	61
Ford Auger Bit Co	68
Forest City Bit & Tool Co	64
Foster Munger Co	58
Fox Machine Co	9
Fox, P. L	65
French, Samuel H. & Co	15
Frink, I. P	68
Gage Tool Co	16
Gem Publishing Co	14
Globe Ventilator Co	15
Goodell Mfg. Co	64
Grand Rapids Hdw. Co	58
Grand Rapids Wood Carving Co	59
Hamlin, George R	10
Hammacher, Schlemmer & Co.	62
Hartmann Bros. Mfg. Co	60
Hess Warming & Ventilating Co	61
Hight, A. W	62
Howes, S. M., Co	68
Ideal Concrete Machinery Co	6
Ideal Ventilator	59
Interior Hardwood Co	1
International Cor. Schools	8
International Heater Co	61
Ives, Hobart B. & Co	58
Jennings, C. E. Co:	68
Johnson, E. J., Co	13
Johnson, S. C., & Son	56
Kanneberg Rfg. & Ceil. Co	18
Karol, B. C	5
Kees, F. D. Mfg. Co	59
Keighley, S. Metal Ceiling & Mfg. Co	12
Kidder, R. E	13
Kimball Bros. Co	15
King Mantel Co	58
King Mfg. Co	59
Kraeuter & Co	64
Lanz, M., & Sons	6
Lane Bros. Co	59
Leavitt Machine Co	51
Lestershire Lumber & Box Co	63
Long Island Machinery Co	5
Lorenzen, Chas. F. & Co	60
McLain, F. C., Co	61
Mallory Mfg. Co	67
Marston, J. M. & Co	5
Mesker & Bro	14
Meyers, F. J. Mfg. Co	10
Mietz, A	15
Millers Falls Co	68
Montross Metal Shingle Co	14
Morse, Williams & Co	15
Morton, Thomas	58
Mullins, W. H. Co	12
National Mfg. Co	59
National Saw Co	66
Nat'l Sheet Metal Rfg. Co	14
New Jersey Zinc Co	14
N. Y. Steel Corner Plate Co.	14
Nicholls Mfg. Co	65&67
North Bros. Mfg. Co	67
O. K. Harry Steel Wks	14
Ostendorf, W. H	59
Ostrander, W. R. & Co	67
Parker Wire Goods Co	67
Parks Ball Bearing Machinery Co.	5
Pettyjohn Co	7
Phila. & Boston Face Brick Co.	16
Pike Mfg. Co	1
Progressive Mfg. Co	62
Reed & Auerbacher Co	16
Rich, J. & G	67
Richards Mfg. Co	51
Sackmann, F. A	5
Samson Cordage Works	68
Schaller-Hoerr Co	57
Scott & Co	6
Sedgwick Mch. Works	15
Seneca Falls Mfg. Co	4
Shimer, Samuel J. & Sons	8
Silver Lake Co	68
Simonds Mfg. Co	16
Smith, Otis A	67
Smith & Egge Mfg. Co	63
Standard Paint Co	9
Stanley Rule & Level Co	67
Stanley Works	1
Star Encaustic Tile Co	14
Starrett, L. S. Co	1&68
Stowell Mfg. Co	11
Strelinger, C. A. Co	65
Taintor Mfg. Co	68
Topp, G. A. & Co	11
Tower & Lyon	64
Truss Metal Lath Co	15
Tubular Heating & Ventilating Co	61
Union Mfg. Co	63
U. S. Mineral Wool Co	16
Van Dorn Iron Wks. Co	5
Waddell Mfg. Co	58
Wagner Mfg. Co	10
Walters, Wm. P. Sons	67
Warner Elevator Mfg. Co	15
Washburne, E. G. & Co	8
Wheeling Corrugating Co	11
White, Van Glahn & Co	68
Wilkinson, A. J. & Co	67
Willis Mfg. Co	12
Woodhouse Hdw. Mfg. Co	66
Wood-Mosaic Flooring Co	16
Woods, A. W	65

Classified List of Advertisers.

Air Compressors
Mietz, A.

Annuaciators
Ostrander, W. R. & Co.

Architects' Details
Lestershire Lumber & Box Co.

Asbestos
Stowell Mfg. Co.

Auger Bits
Ford Auger Bit Co.
Jennings, C. E. Co.

Awnings
Chattanooga Roofing & Fdry. Co.
O. K. Harry Steel Works

Band Saws
American Wood Working Machinery Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Crescent Machine Co.
Fay, J. A. & Egan Co.

Barrel Swings
Leavitt Machine Co.

Bath Fittings
Chicago House Wrecking Co.

Blackboards, Slate
Johnson, E. J. Co.

Blinds
Burlington Venetian Blind Co.
Foster-Munger Co.
Schaller-Hoerr Co.

Blind Hinges
Parker Wire Goods Co.
Stanley Works

Bolts and Nuts
Boston Bolt Co.

Books
Arthur, Wm.
Comstock, Wm. T.
Gem Publishing Co.
Williams, David, Co.

Boring Machines
Fox Machine Co.
Millers Falls Co.

Bracket Hangers
Wagner Mfg. Co.

Brick Machinery
Cement Machinery Co.

Builders' Hardware
Boston Bolt Co.
Hammacher, Schlemmer & Co.

Building Brackets, Folding
Stanley Works
Tower & Lyon Co.

Building Material
Lestershire Lumber & Box Co.

Building Paper and Felt
Cabot, Samuel.
Standard Paint Co.

Builders' Supplies
Schaller-Hoerr Co.

Butts and Hinges
Stanley Works.

Capitals
Grand Rapids Wood Carving Co.
Waddell Mfg. Co.

Ceiling, Metallic
Berger Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Keighley, S. Metal Ceiling & Mfg. Co.
Wheeling Corrugating Co.
Willis Mfg. Co.

Cement
French, S. H. & Co.

Cisterns, Steel
O. K. Harry Steel Works.

Clamps
Batavia Clamp Co.
Cincinnati Tool Co.

Concrete Block Machines, Portable
Cement Machinery Co.
Enterprise Fdry. Co.
Ideal Concrete Machinery Co.
Pettyjohn Co.

Conductor Pipes
American Rolling Mill.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.

Conservatories
Burnham, Hitchings, Pierson Co.

Contractors' Supplies
Boston Bolt Co.

Cornices, Sheet Metal
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mesker & Bro.
Mullins, W. H. Co.
Willis Mfg. Co.

Cresting
Van Dorn Iron Works Co.
Willis Mfg. Co.

Cutter Heads
Shimer, Sam'l J. & Sons.

Designs and Details
(See House Plans)

Door Checks and Springs
Hammacher, Schlemmer & Co.

Door Hangers
Lane Bros. Co.
National Mfg. Co.

Draw Knives
Wilkinson, A. J. & Co.

Drawing Instruction
International Correspondence Schools.

Drawing Outfits
Comstock, Wm. T.
Rich, J. & G.

Drying Stoves
Drouve, G. Co.
Howes, S. M. Co.

Dumb Waiter Fixtures
Hammacher, Schlemmer & Co.

Dynamos
Mietz, A.

Eave Troughs
Chattanooga Roofing & Fdry. Co.
Eller Mfg. Co.
Wheeling Corrugating Co.

Elevators and Dumb Waiters
Energy Elevator Co.
Kimball Bros. Co.
Meyers, F. J. Mfg. Co.
Morse, Williams & Co.
Sedgwick Machine Works.
Warner Elevator Mfg. Co.

Engines
Mietz, A.

Etching Fluid
Reed & Auerbacher Co.

Expansion Bolts
Boston Bolt Co.
Diamond Expansion Bolt Co.

Fencing
O. K. Harry Steel Works.

Files and Rasps
Barnet, G. & H. Co.
Boston Bolt Co:

Framing Tools
Topp, G. A., & Co.

Furnaces and Heaters
Boynton Furnace Co.
Floyd-Wells Co.
Hess Warming & Ventilating Co.
International Heater Co.
Tubular Heating & Ventilating Co.

Gas and Electric Fixtures
Frink, I. P.

Grates
King Mantel Co.

Grates, Fancy Plated
Chattanooga Roofing & Fdry. Co.

Greenhouses
Burnham, Hitchings, Pierson Co.

Grille Work, Wood
Foster-Munger Co.
Waddell Mfg. Co.

Grindstones
Cleveland Stone Co.
Richards Mfg. Co.

Grooving Heads
Fox Machine Co.

Hangers, Barn Door
Richards Mfg. Co.

Hangers, House Door
Richards Mfg. Co.

Hardware Jobbers
White, Van Glahn & Co.

Hardware Specialties
Champion Safety Lock Co.
Richards Mfg. Co.

Hasps, Hooks and Staples
Woodhouse Hdw. Mfg. Co.

Heaters.—*Steam and Hot Water.*
Burnham, Hitchings, Pierson Co.
International Heater Co.

Heaters, Steam and Gas Combined
McLain, Frank C. & Co.

Hinges, Spring
Bommer Bros.

Hinges, Window Screen
Kees, F. D. Mfg. Co.

Hoists
Mietz, A.

House Plans
Comstock, Wm. T.

Iron House Fronts
Mesker & Bro.

Iron Work
Van Dorn Iron Works Co.

Joist Hangers
Lanz, M. & Sons.

Lath, Metal
Truss Metal Lath Co.
Wheeling Corrugating Co.

Lavatories
Chicago House Wrecking Co.

Levels
Baker, McMillen Co.
Bostrom-Brady Mfg. Co.
Davis & Cook.

Lightning Rods
Washburn, E. G. & Co.

Lumber and Shingles
Lestershire Lumber & Box Co.

Mangers, Slow Feed
Broad Gauge Iron Stall Works.

Mantels
Burritt, A. W., Co.
Foster-Munger Co.
French, Sam'l H. & Co.
King Mantel Co.
Lorenzen, C. F. & Co.
Ostendorf, W. H.
Phila. & Boston Face Brick Co.

Marine Engines
Mietz, A.

Masons' Stoves
Drouve, G. Co.

Metal Lath
Truss Metal Lath Co.

Mill Work
Schaller-Hoerr Co.

Mineral Wool
Columbia Mineral Wool Co.
U. S. Mineral Wool Co.

Miter Boxes
Goodell Mfg. Co.
Nicholls Mfg. Co.

Miter Machines
Fox Machine Co.

Miters
Fox, P. L.

Moldings
American Column Co.
Grand Rapids Wood Carving Co.
Schaller-Hoerr Co.
Waddell Mfg. Co.

Mortar Colors
French, Sam'l H. & Co.

Ornamental Sheet Metal Work
Mullins, W. H. Co.

Ornamental Wire, Iron, Steel and Brass Work
Meyers, F. J. Mfg. Co.

Paint
New Jersey Zinc Co.
Standard Paint Co.

Parquette Flooring
Interior Hardwood Co.
Johnson, S. C., & Son.
Wood-Mosaic Flooring Co.

Patent Lawyers
Hamlin, George R.

Pencils
Dixon, Jos. Crucible Co.

Planes
Gage Tool Co.
Smith, Otis A.
Tower & Lyon Co.
Union Mfg. Co.

Plasterers' Corner Plates
New York Steel Corner Plate. Co.

Plastic Ornaments
French, Samuel H. & Co.

Plumbers' Supplies
Karol, B. C.

Porch Columns
American Column Co.
Hartman Bros. Mfg. Co.

Post and Mining Machinery
Cement Machinery Co.

Pumps
Mietz, A.

Reflectors
Frink, I. P.

Roof Brackets
Wagner Mfg. Co.

Roofing, Art Metal Tile
Mullins, W. H. Co.

Roofing and Siding
Asphalt Ready Roofing Co.
Berger Mfg. Co.
Canton Steel Roofing Co.
Drouve, G. Co.
Eastern Granite Roofing Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Lincoln Waterproof Cloth Co.
O. K. Harry Steel Works.
Scott & Co.
Standard Paint Co.
Stowell Mfg. Co.
Wheeling Corrugating Co.

Roofing Brackets
Stanley Rule & Level Co.

Roofing Paint
Asphalt Ready Roofing Co.
Dixon, Jos. Crucible Co.

Roofing Slate
Johnson, E. J. Co.

Sash Balances
Caldwell Mfg. Co.

Sash Chains
Bridgeport Chain Co.
Morton, Thomas.
Smith & Egge Mfg. Co.

Sash Cord
Samson Cordage Works.
Silver Lake Co.

Sash Locks
Champion Safety Lock Co.
Ives, H. B. & Co.

Sash Operating Devices
Burnham, Hitchings, Pierson Co.

Sash Pulleys
Grand Rapids Hardware Co.

Sashes, Doors and Blinds
Foster-Munger Co.
Lestershire Lumber & Box Co.

Saw Clamps
Disston, Henry & Sons.

Saw Filing Guide
Disston, Henry & Sons.

Saw Jointers
Crescent Machine Co.

Saw Sets
Taintor Mfg. Co.

Saw Tables
Chicago Machinery Exchange.
Crescent Machine Co.
Kidder, R. E.

Saws
Atkins, E. C. & Co.
Disston, Henry & Sons.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
National Saw Co.
Simonds Mfg. Co.

Scaffold Brackets
Bracket Hook Co.
Wagner Mfg. Co.

Schools
American School of Correspondence
International Correspondence Schools.

Screw Drivers
u ter & Co.
North Bros. Mfg. Co.

Sheet Metal Fronts
Mesker & Bro.

Shingles and Tiles, Metallic
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Cortright Metal Roofing Co.
Montross Metal Shingle Co.
National Sheet Metal Roofing Co.
Willis Mfg. Co.

Shingles Hip
Wheeling Corrugating Co.

Shingle Stains
Cabot, Samuel.

Shutter Worker
Mallory Mfg. Co.

Shutters (See Blinds)

Skylights
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Drouve, G. Co.
Edwards Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mullins, W. H. Co.
Willis Mfg. Co.

Speaking Tubes
Ostrander, W. R. & Co.

Spring Hinges
Bommer Bros.

Squares
Duby & Shinn.
Fox, P. L.
Nicholls Mfg. Co.

Squares, Combination
Hight, A. W., Toledo, O.

Steel Figures and Letters
Sackman, F. A.

Steel Square Key
Woods, Alfred W.

Stoves and Ranges
Boynton Furnace Co.

Structural Iron and Stee Works
Boston Bolt Co.

Structural Slate
Johnson, E. J. Co.

Tanks, Steel
O. K. Harry Steel Works.

Tiling
King Mantel Co.
Ostendorf, W. H.
Star Encaustic Tile Co.

Tool Boxes
Walter's Sons, W. P.

Tool Cabinets
Hammacher, Schlemmer & Co

Tool Chests
Jennings, C. E. Co.

Tools
Forest City Bit & Tool Co.
Gage Tool Co.
Hammacher, Schlemmer & Co
Jennings, C. E. Co.
Kraeuter & Co.
Millers Falls Co.
North Bros. Mfg. Co.
Progressive Mfg. Co.
Reed & Auerbacher Co.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S., Co.
Strelinger, C. A., Co.
Tower & Lyon Co.
Walter's Sons, Wm. P.
Wilkinson, A. J., & Co.

Turned, Molded Carved Work
Waddell Mfg. Co.

Ventilating Attachment
Drouve, G., Co.

Ventilators
Globe Ventilator Co.

Ventilators, Window
Ideal Ventilator Co.

Veranda Stock
American Column Co.

Vises
Hammacher, Schlemmer & Co

Wagon Jacks
Batavia Clamp Co.

Water Closets
Chicago House Wrecking Co.

Wax, Finishing and Polishing
Johnson, S. C., & Son.

Weather Strips
Hammacher, Schlemmer & Co
King Mfg. Co.

Weather Vanes
Broad Gauge Iron Stall Works.

Window Apparatus
Drouve, G. Co.

Window and Door Stops
King Mfg. Co.

Window Fasteners
Stanley Works.

Window Stop Adjusters
Ives, Hobart B., & Co.

Window Trimmings
Caldwell Mfg. Co.

Windows, Fireproof
Mullins, W. H. Co.

Wood Carving
Grand Rapids Wood Carving Co.

Wood Mantels
(See Mantels)

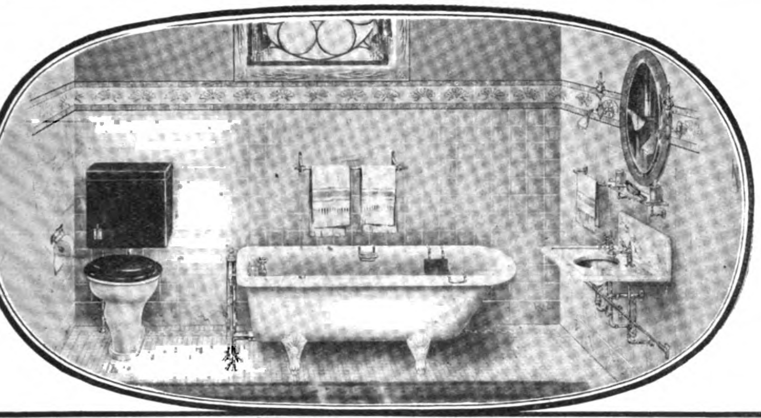
Wood Ornaments
Waddell Mfg. Co.

Wood Trimmers
Fox Machine Co.

Wood Working
Lestershire Lumber & Box Co.

Wood Working Machinery
American Wood Working Mach'y Co.
Barnes, W. F. & John.
Barnes Tool Co.
Chicago Machinery Exchange.
Cordesman Machine Co.
Fay, J. A. & Egan Co.
Fox Machine Co.
Kidder, R. E.
Long Island Machinery Co.
Marston, J. M. & Co.
Parks Ball Bearing Machinery Co.
Seneca Falls Mfg. Co.

Wood Working Machinery, Second Hand
Long Island Machinery Gy.



This Bath Room Outfit $55.00

CLEAN—SANITARY—ODORLESS—NEWEST DESIGNS—BEST APPLIANCES—FINEST NICKEL TRIMMINGS

THE BATH TUB Seamless cast iron, heavy 3-inch roll rim, 5 feet in length and 30 inches in width, finest white porcelain enameled on the inside and over the roll rim. The fittings are extra heavy brass nickel-plated, consisting of Outside Standing "Roman" waste with china index button; Fuller double bath cock; off-set supply pipes; with floor flanges.

THE LAVATORY Countersunk genuine marble slab; solid porcelain 14x17 inch Patent overflow oval basin; nickel-plated brass rope pattern brackets; nickel-plated brass Fuller basin cocks; nickel-plated brass supply pipes; with air chambers; nickel-plated brass trap (both trap and supply pipes to the wall); nickel-plated chain and rubber stopper; basin clamps, screws; and nickel-plated flanges.

THE CLOSET Low tank pattern, thoroughly sanitary and modern in construction; latest improved Vitreous syphon wash-down bowl; seat and cover made of seasoned quarter-sawed Oak with high polished finish; seat attaches directly to the bowl with post and nickel-plated hinges; tank is lined with heavy copper and includes a high pressure ball cock and float valve syphon, and has nickel-plated push button action; two-inch elbow connection between the tank and the bowl, and nickel-plated supply pipe from floor to the tank.

QUALITY We guarantee every article used in this Bath Room outfit to be new and perfect. The enamel ware is guaranteed for two years against crazes, chips or defects from ordinary wear. Any article proven defective within this time will be cheerfully replaced with perfect material. The outfit will be furnished with floor screws, flanges, clamps, etc., complete and ready to set up.

Connections easily made. Any ordinary mechanic can install with the aid of our comprehensive working plans and instructions. **Satisfaction Guaranteed or Money Refunded.**

PRICE, as Described, $55.00

We will furnish the additional trimmings—paper holder—two towel bars—glass shelf—bath seat and soap cup, for $7.00.

Other Bath Room Outfits from $25.00 to $125.00

WRITE US Anyone interested in Plumbing Material or Heating Apparatus of any kind, will do well to write to us before buying elsewhere, as we have the largest and finest selection in the world, and can save purchaser considerable money—all fully guaranteed.

All the material used in this outfit is absolutely brand new.

We Can Save You 30 to 50 per cent. on Your Lumber Bills

We are engaged in dismantling the Fifty Million Dollar St. Louis World's Fair. We purchased this greatest of Expositions outright and offer you a wonderful opportunity to save at least 30 per cent. on your purchase in this line. Better lumber than that which we are offering does not grow. Its year of service has only tended to increase its value. It is thoroughly seasoned. We must sell this lumber at once.

SEND US YOUR LUMBER BILLS FOR OUR ESTIMATE

On application we will quote you prices Freight Prepaid to your nearest Shipping Point.

Now is your opportunity to put into execution your long contemplated improvements. We have lumber for every purpose; for Building Houses, Barns, Cribs, Farm Buildings, Fences, etc., etc.

10,000 good Doors, $1.00, Also Fancy Doors from $1.50 to $4.00. Sash for every purpose. 2,000 Greenhouses Sash, 3 x 6 inches, glazed, at $1.65.

We have an Office on the Exposition Grounds at St. Louis. Visitors are cordially invited to visit our Headquarters at that point.

Quick delivery if you order at once. Special low prices are made for lumber for delivery within the next 30 days.

We can furnish Studding, Joists, Planking, Dressed and Matched Flooring, Sheathing, Timbers, in fact, lumber for any purpose.

STEEL ROOFING $1.75 PER 100 SQ. FEET

Painted red both sides, most durable and economical roofing, siding or ceiling for barns, sheds, houses, stores, cribs, poultry houses, etc. Easier to lay and cheaper than any other material. No experience necessary to lay it. A hammer or hatchet are the only tools you need.

WE PAY THE FREIGHT

to all points east of Colorado, except Colorado, Oklahoma, Texas and Indian Territory. This is our No. 15, semi-hardened, **flat steel roofing,** 24 x 24 inches, per square of 100 square feet........**$1.75**

Corrugated V Crimped or standing seam, per square **1.85**

For 25c. per square more we furnish this material in 6 and 8 ft. lengths.

Brick siding and beaded ceiling or siding, per 100 square feet........**$2.25**

"EAGLE" FELT ROOFING 60 CENTS PER 108 SQUARE FEET

Two-ply "Eagle" Brand Roofing without Supplies, per square	**60c**
Three-ply "Eagle" Brand Roofing without Supplies, per square	**90c**
Vulcanite Roofing, with nails, caps and cement; does not require coating, per square	**$1.75**
Galvanized Rubber Roofing, the finest ready roofing manufactured, good enough for any kind of Building, also useful and practical for lining purposes. Nails, caps and cement furnished. Does not require coating after it is on the roof. Three grades, **$1.50, $1.90** and **$2.15** per square. Samples furnished free.	
Galvanized Iron Conductor Pipe, size 3 in, per 10 ft. length	42c
Galvanized Iron Eave Trough, size 3½ in., per 10 ft. length	31c
Galvanized Iron Elbows, 3 inch, each	14c
Eave Trough Corners, each	18c
Eave Trough Hangers, per dozen	24c
Galvanized Ridge Roll, 2 inch roll, per foot	4¾c

THOUSANDS OF OTHER ITEMS

Hardware, Iron Pipe, Heating Apparatus, Paints, Tools, Pumps, Tanks, Boilers and Engines, Dynamos, Electrical Apparatus Fire Hose, Fencing, Wire, Safes, Vault Doors, etc., etc.

Ask for Catalog No. 608

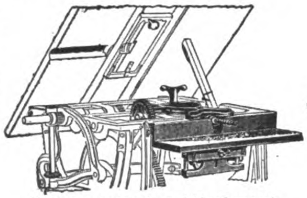
Chicago House Wrecking Co.

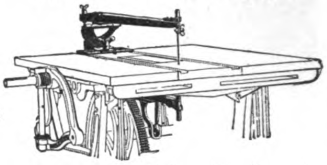
35th and Iron Sts., Chicago

If You Knew Of A Man

who could do as much work as 4 good men, would you hesitate to hire him? Don't believe you would wait a minute. Well, here is about the same proposition: one man with the No. 5 Union Combination Self-feed Rip and Cross-Cut Saw will do as much as four men using hand tools, will do it easier and will do it better. Wouldn't it be economy for you to get a Union Combination Saw and save 3 men's wages?


"Union" Moulding Attachment.


"Union" Boring Attachment.


"Union" Scroll Saw Attachment.

No. 5 "Union"

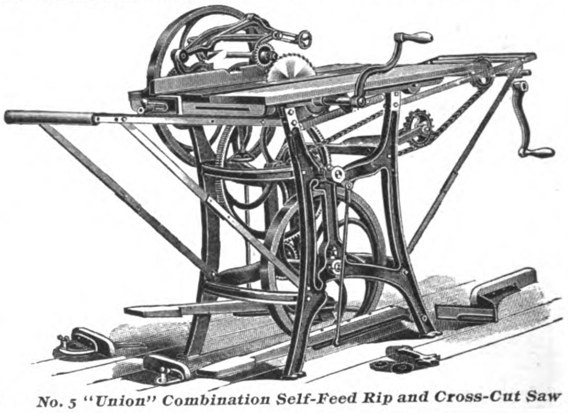
Combination Self-Feed Rip and Cross-Cut Saw

is suitable for various kinds of work—ripping (up to 3½ inches thick), cross-cutting, mitering, etc., and, with additional attachments, rabbetting, grooving, dadoing, boring, scroll-sawing, edge-moulding, beading, etc. Almost a complete workshop in one machine.

Send for Catalog "A" fully describing our complete line of foot, hand and light power wood working machinery.

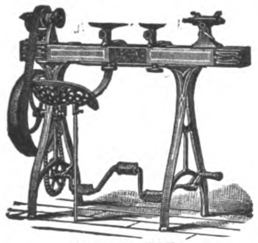
The Seneca Falls Mfg. Co.
209 Water St.,
SENECA FALLS, N. Y., U. S. A.

105


No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw.

HAND POWER FOOT

WOOD-WORKING MACHINERY.


No. 3 LATHE.

A Complete Line for a Carpenter and Builder.


Tenoner.

Our Machines are so constructed that you can take them to the house you are building.

. . . Saves Time.


No. 2 SCROLL SAW.


No. 7 SCROLL SAW.

Any of our machines will pay for themselves in a year and often in a single job.

Why buy these Machines? BECAUSE

You can save a mill man's profit.
You can make more money with less capital invested.
You can manufacture in as good style and finish, and at lower cost than the mill.
You can work up stuff ahead in winter for the spring rush in building.
10,000 builders are using from one to eight of our different machines.

Our machines are not complicated, but simple, strong, practical and built for good hard work.

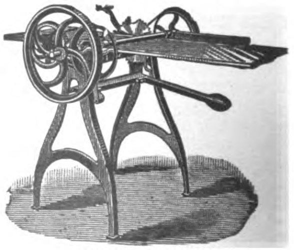

FORMER.

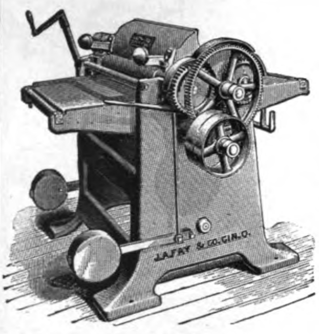

No. 4 SAW.


MORTISER

Send for Catalogue and Prices.

W. F. & JOHN BARNES CO., 71 RUBY ST. ROCKFORD ILL.


HAND RIPSAW.



EVERY CARPENTER NEEDS THIS PLANER

THIS No. 2 Surface Planer will surface all kinds of hard or soft wood in the most satisfactory manner. If you have any amount of this work, you can do it better, quicker, easier and cheaper with this machine than by any other method.

Three sizes are made. To plane 16, 20 and 24 inches wide and from 1-6 to 6 inches thick. It requires very little power and will be found of great advantage to any shop.

A descriptive circular gives complete details of the construction of this machine.

Write for it to-day.

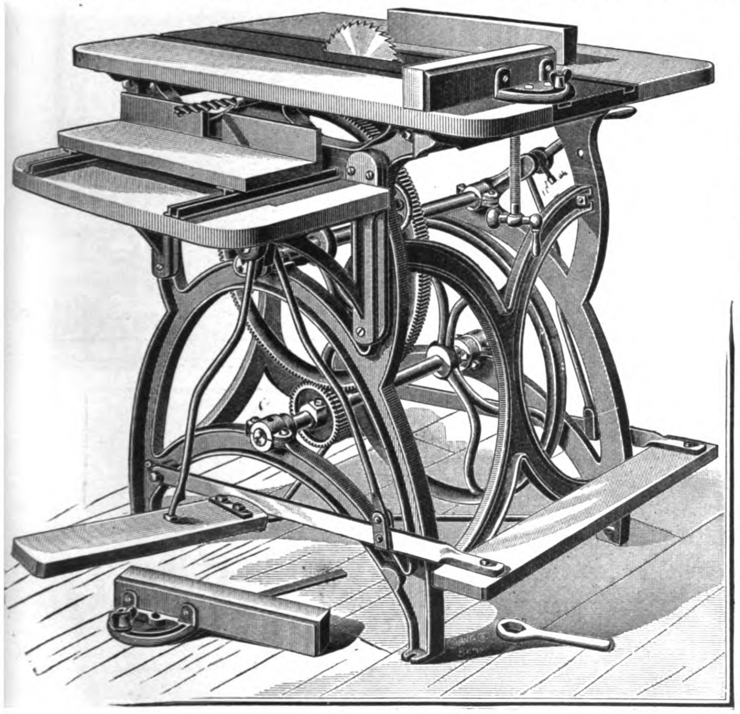
221-241 W. Front Street

Cincinnati, Ohio, U. S. A.

J. A. FAY & EGAN CO.

The World's Standard for Woodworking Machinery.

Marston's Hand and Foot Power Circular Saw.



Iron frame, 36 inches high.

Center part of top is made of iron accurately planed, with grooves on each side of saw for gauges to slide in.

Steel shafts and best babbitt metal boxes.

Gears are all machine-cut from solid iron.

Boring table and side treadle.

Two 7-inch saws and two crank handles with each machine.

Weight complete, 350 pounds.

Send for catalogue.

J. M. MARSTON & CO., 201 Ruggles St., Boston, Mass.

VAN DORN IRON WORKS CO

CLEVELAND, OHIO.

STRUCTURAL STEEL & ORNAMENTAL IRON WORK.

JAIL WORK, JOIST HANGERS, IRON FENCINGS.

CARPENTERS

Young men desiring to fit themselves for paying positions should fill out and send this advertisement to us to-day and receive our 200 page handbook (FREE) describing our Carpenters' course and over 60 others, including Architecture, Contractors' and Builders,' Architectural Drafting courses, Electrical, Mechanical, Steam and Civil Engineering, Heating, Ventilation, and Plumbing, Mechanical Drawing, etc.

American School of Correspondence

Chicago, Ill.

Name..

Address..

City and State..

C. & B. 4-06

SECOND-HAND WOOD WORKING MACHINERY

Woods Moulder 12 in. Matchers 24 in.
Berlin Moulder 15 in. Pony Planers 16, 20, 24 in.
Rogers Moulder 8 in.

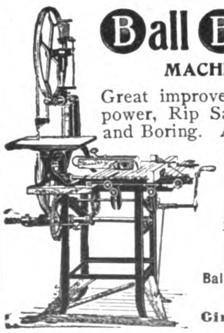
Variety Machines, Double and Single, Jointers, Swing Saws, Rolling Top Saw Tables, Gas and Gasoline Engines, Band Saws, Routers, Sanders, Circular Saws, Jig Saws.

A1 CONDITION. PROMPT DELIVERY.

All Kinds of Machinery Purchased for Cash.

LONG ISLAND MACHINERY CO.

15 Washington Ave., Brooklyn, N. Y.



Ball Bearing

MACHINERY.

Great improvement for foot power, Rip Saw, Band Saw and Boring. All ready for use, same for power. Other attachments and useful tools.

Manufactured by

PARKS

Ball Bearing Mach. Co.

Sta. A.,

Cincinnati, Ohio

MARK YOUR TOOLS WITH A STEEL STAMP.

SEND FOR PRICE-LIST No. 7

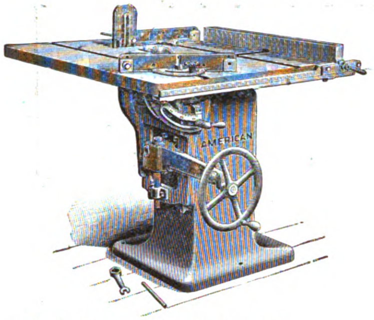


Fig. 637. No. 1 Clement Variety Saw Bench.

Machines which can stand Investigation

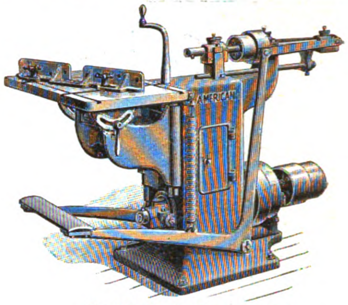


Fig. 982. No. 2½ Clement Borer.

Send for Catalogue.

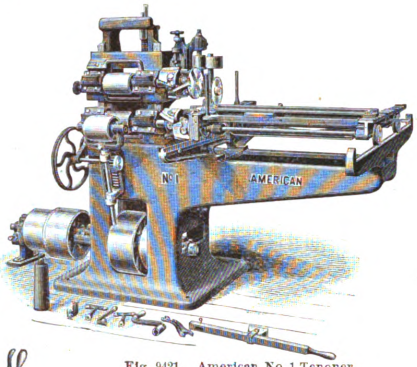


Fig. 9421. American No. 1 Tenoner.

Write for Prices.

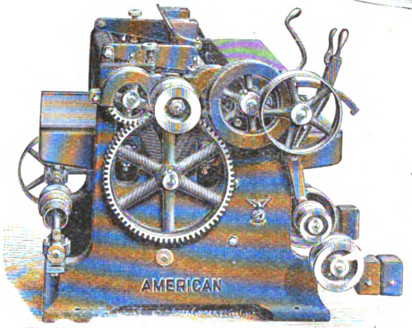


Fig. 7621. No. 112 American 24" and 30" by 8" Single and Double Surfacer.

American Wood Working Machinery Co.

NEW YORK: 136 Liberty St.
CHICAGO: 43 So. Canal St.
NEW ORLEANS; Hennen Bldg.

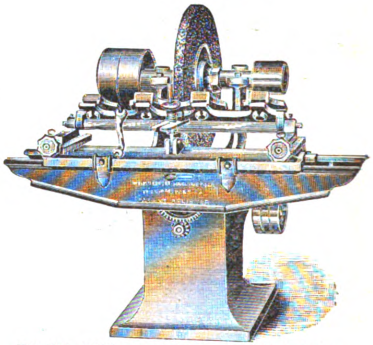
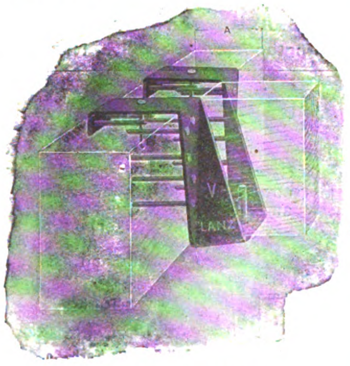


Fig. 1134. Williamsport Automatic Knife Grinder.

Made in Pittsburgh "Lanz" Joist Hangers and Stirrups

We court comparison. Prices attractive. Joist Hangers made to spike on, for brick-work, concrete blocks and I-beams. Write for descriptive matter 312.



PATENT APPLIED FOR

1865 M. Lanz & Sons 1906
Pittsburgh, Pa.

Simplicity, Rapidity Adaptability, Durability ARE THE FOUR CARDINAL POINTS

Combined in

NO Wheels, Chains, Cogs, Gears or Cranks. Nothing to Clog, Break or get out of order. No loss of time or labor.

The Ideal Hollow Concrete Block Machine "The Peer of All"

Manufactured by

Ideal Concrete Machinery Co.
Formerly Aurburn, Ind. **South Bend, Ind.**

Handsome Catalog and Booklet for the asking.

Face formed on bottom of the mould. Cores withdrawn horizontally by lever—not by hand. **Guaranteed** capacity, two men, 10 hours, 200 blocks. A portable machine that can be carried with ease by two men. Over 200 in use in the State of Indiana alone. The only machine with which can be accomplished the facing of blocks by the Borst system. A business proposition to the maker of blocks. An appeal to the common sense judgment of the builder.

In corresponding with us we make our business your interests.

CORRUGATED IRON Painted and Galvanized. } **SCOTT & CO., Cincinnati, O.** Agents Wanted } **IRON ROOFING** Painted and Galvanized.

EXPOSITION

OF

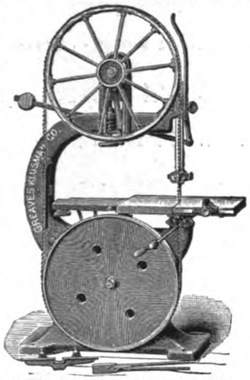
Wood Working Machinery

FOR

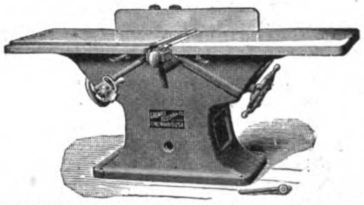
Carpenters and Builders

Modern in design and construction, with improved methods of adjustment. Circulars and descriptive matter sent upon request.

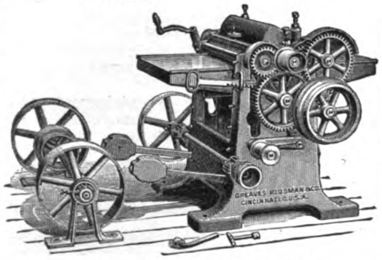
COME AND SEE US!



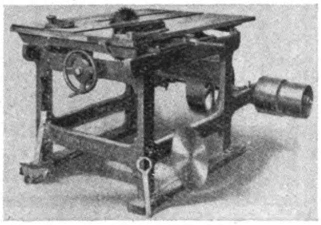
NEW PATENT 36-INCH BAND SAWING MACHINE.
Furnished with rip gauge, roller guards, wood rim wheels, etc. Table can be tilted 45°.



IMPROVED HAND PLANER AND JOINTER,
Tables over 7 feet long and have steel lips.
Cylinder Slotted to receive moulding bits and other irregular knives.
Cylinder has three Bearings, one of which is outside of pulley.

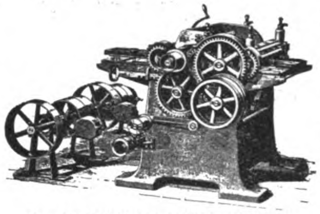


No. 2½ SURFACE PLANING MACHINE.
Planes 24½ inches and any thickness, from 1-16 to 8 inches.



A CARPENTER SHOP IN ITSELF.

CHICAGO No. 2 COMBINATION SAW TABLE.
An excellent machine for ripping, cutting-off, mitering, dadoing, boring, etc.

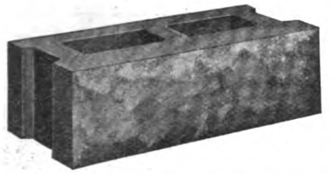


No. 2½ IMPERIAL 6-ROLL PLANER, MATCHER AND MOULDER.
Cylinder double belted, six large feed rolls. Fast and slow feed. Planes 24¼ inches wide, 8 inches thick, and matches up to 12 inches wide. Weight 3000 lbs.

WRITE FOR PRICES ON REBUILT MACHINERY.

CHICAGO MACHINERY EXCHANGE, 13-15 North Canal Street,
CHICAGO, ILL.

Portable Hollow Concrete Block Machine



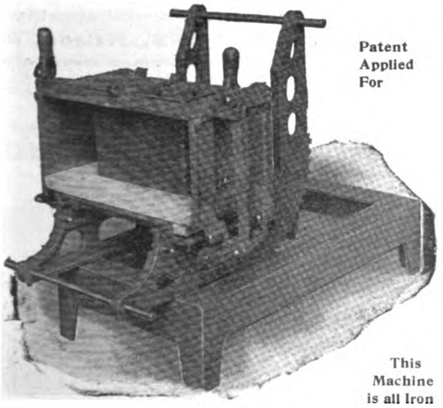
BEST—FASTEST—SIMPLEST—CHEAPEST.

MOVE THE MACHINE—NOT THE BLOCKS

Saves labor of off-bearing, avoids loss by crackage or breakage, saves expense of heavy cumbersome iron pallets. Sand, Water and Portland Cement only materials required. BIG PROFITS. Blocks cost 6 cents to make. Sell for 18 cents. Whole outfit costs $125.00.

FULLY GUARANTEED. SENT ON TRIAL.

THE PETTYJOHN CO., 616 North 6th Street,
TERRE HAUTE, IND.



Patent Applied For

This Machine is all Iron

The Perfection Cement Block Machine

Makes the BEST Hollow Cement Blocks of any Machine on the Market. It Tamps on the Face, an Important Fact to Consider when Purchasing a Cement Block Machine.

Price 50 Dollars

Weight 700 Pounds

Just the thing for the Mason, Builder, Contractor or any person with Small Capital desiring to enter into a

PROFITABLE BUSINESS

This Machine has reached the height of Perfection in Simplicity, Durability and Quickness. DON'T DELAY! DON'T HESITATE!

Send for our Descriptive Circular and Prices.

MANUFACTURED BY

ENTERPRISE FOUNDRY COMPANY

Office and Works: 81 OLEAN STREET ROCHESTER, N. Y.

COPPER LIGHTNING RODS

ABSOLUTE PROTECTION from LIGHTNING is given by use of our continuous copper conductors.

E. G. Washburne & Co., 46 Cortlandt St., New York.
Telephone 3125 Cortlandt.
Work put up or material furnished.

THE IMPROVED Hand and Foot Power **E. F. B.**

SAWING MACHINE.

For Carpenters, Builders and All Wood Workers Who Have Shops Without Power.

SEND FOR CIRCULAR.
THE BARNES TOOL CO., New Haven, Conn.

Diamond Expansion Bolt.

Patented.

For fastening fixtures, timbers, etc., to brick, stone concrete or other masonry.

DIAMOND EXPANSION BOLT CO.,
9-11-13-15 Murray Street, New York, N. Y

A Millstone About the Neck

Lack of special training is the "millstone about the neck" of most carpenters and wood workers in poor paying positions. It holds them back while others go ahead. It handicaps them everywhere. The I. C. S. system of training by mail will enable you to throw off the burden. By this means you can rise to one of the higher positions in your present trade or profession. You can qualify for a more congenial occupation and better salary. We have helped thousands of ambitious carpenters and wood workers to advance in salary and position. We can do it for you. Decide today to better your condition—then let us help you.

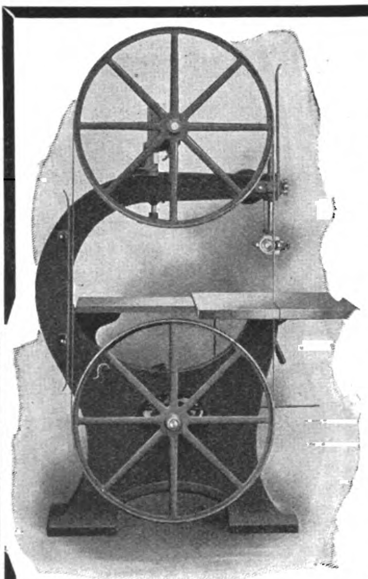
Mark X before the position that interests you, fill in the coupon and mail it to us, and we will send full particulars.

INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 969, Scranton, Pa.

Please send me a free copy of "1001 Stories of Success," and explain how I can qualify for position before which I have marked **X**.

- Architect
- Architectural Drafts.
- Building Inspector
- Bridge Engineer
- Contractor and Builder
- Mechanical Engineer
- Mechanical Draftsman
- Machine Designer
- Electrical Engineer
- Municipal Engineer
- Heat. and Vent. Eng.
- Chemist
- Sheet-Metal Draftsman
- Sanitary Engineer
- Electrician
- Steam Engineer
- Marine Engineer
- Civil Engineer
- Surveyor
- Textile Expert
- Bookkeeper
- Stenographer
- Ad Writer
- French } With Edison Phonograph
- German
- Spanish

*Name*____________________
*St. & No.*____________________
*City*____________ *State*________ 3



The Rigid Construction and Modern Design of the New 36-inch CRESCENT BAND SAW insure a machine of the very highest effciency as a rapid producer of accu-rate work.

CRESCENT machines cost less than others of equal merit.

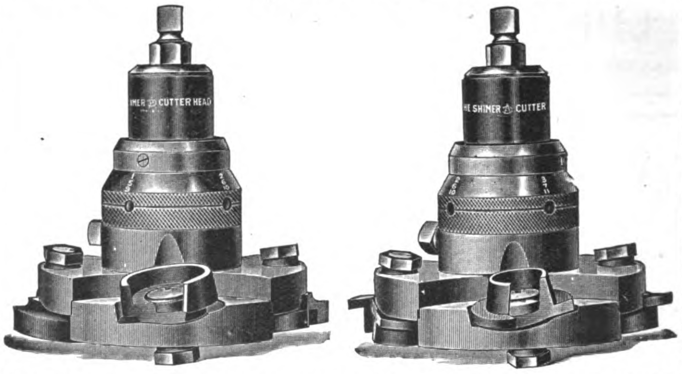
They are best because they are strong, durable and practical.

They are low in price because they are in big demand and we have to build them in large quantities.

Send at once for catalogue describing our complete line of BAND SAWS, SAW TABLES and JOINTERS.

THE CRESCENT MACHINE COMPANY, 206 Main Street, Leetonia, Ohio, U.S.A.

Durable and Always Reliable



THE SHIMER CUTTER HEADS

ARE MADE OF STEEL FORGINGS OF A GUARANTEED TENSILE STRENGTH OF 60,000 LBS. TO THE SQUARE INCH;

The Cutters are made of the Best Quality Tool Steel, tempered to file or to grind and guaranteed superior as regards cutting quality and general edge holding properties.

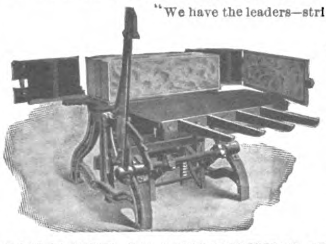
They Cut with Ease the worst cross-grained and knotty lumber you may find and do the work perfectly.

When you want a Cutter Head of any kind, write us fully and let us submit you prices.

Address SAMUEL J. SHIMER & SONS, Milton, Pa.

CONCRETE BLOCK, BRICK, POST and MIXING MACHINERY

"We have the leaders—strictly high grade"



NORMANDIN BLOCK MACHINES

HIGHEST AWARDS

FAVORITE CONCRETE BRICK MACHINES

CEMENT MACHINERY CO., Hall Bldg., **Jackson, Mich.**

CORDESMAN, MEYER & CO., 26, 28 and 30 Central Avenue,

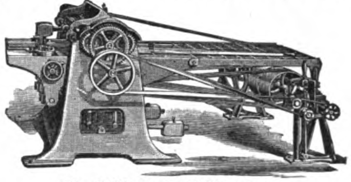
Universal Wood-Worker.

CINCINNATI, OHIO.

Finest Grades of Latest Improved

Wood-Working Machinery

For Planing Mills, Furniture and Chair Factories, Carriage, Wagon and Agricultural Works. Circulars and prices. Correspondence solicited.



No. 2 Planer and Matcher.

We want Carpenters and Builders

To Handle and Sell

The Edwards Metal Ceilings

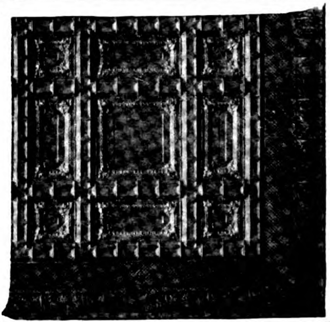
No trouble to erect. Any carpenter can put up same. Send us your inquiries with measurements, etc., and we will forward a carefully prepared drawing showing how the ceiling will look when finished.

Our Catalog L sent free for the asking. Explains in detail.

THE EDWARDS MANUFACTURING CO.

"THE SHEET METAL FOLKS"

New York, 52 Broadway. Main Office and Works, 423-443 Eggleston Ave., Cincinnati, Ohio



Its application is very simple— no experienced help is needed. With every roll are included nails, tin caps and cement sufficient for the work. **RUBEROID** is so pliable that it fits anywhere.

THE well-told truth has for 13 years drawn builders' attention to **RUBEROID ROOFING**—demonstration of this truth has made its believers legion. **RUBEROID ROOFING** does all claimed for it. It *is* water and weather-proof. Its resistance to acids, gases, great heat and even fire is extraordinary. It will *not* melt, rot or crack. But "above all things" avoid imitations. Look for the registered trade mark "**RUBEROID**" always stamped on the under side. Send for samples.

MANUFACTURED SOLELY BY

THE STANDARD PAINT CO.,

100 William St., New York

CHICAGO OFFICES: 188-90 Madison St.

We make Ceilings for churches, schools, stores, lodge rooms, court rooms, libraries, residences, etc.

Our ceilings are shipped ready for erection. No expert labor required. Working drawings furnished. They're adapted to any kind of building. Exclusive in classified design.

Berger "CLASSIK"

Steel Ceilings

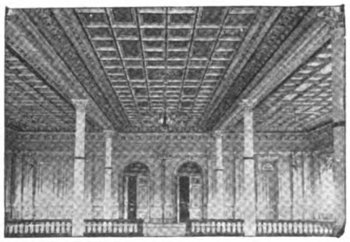
We also make Steel Roofing, Siding, Metal Shingles, Architectural Sheet Metal Work and Fireproofing Material.

Our catalogues sent you free. Ask for them.

THE BERGER MFG. CO.

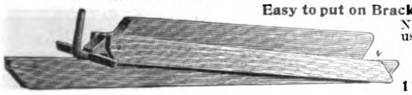
CANTON, OHIO.

New York. Boston. Phila. St. Louis



JACKSON'S SCAFFOLD BRACKET HOOK

The Simplest, Strongest and Cheapest Device made for Holding up Scaffolding. Hook is ten inches long, made of best malleable iron, and saves its cost many times over in one season's work.



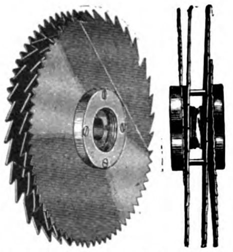
Easy to put on Bracket. **Easy to put Bracket on Building.**

No wiggling or falling scaffolds where this hook is used. *Write for Circulars.* Sold to builders with or without the folding brackets.

BRACKET HOOK CO.,

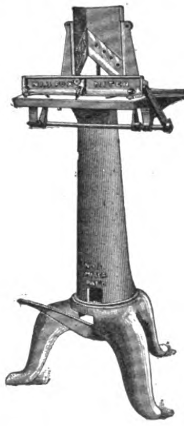
119 N. Winnebago Street, Rockford, Ill.

FOX



Adjustable Saw Dado Heads

The best thing for cutting grooves.



Fox Foot Power Miter Machines

The best thing for mitering mouldings and similar work.

We also make

Universal Trimmers,
Boring Machines, Lathes,
Planers, etc.

FOX MACHINE CO.

387 N. Front St., Grand Rapids, Mich.

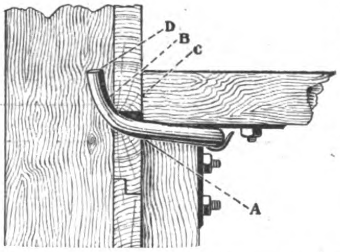
"AMERICAN"
Polygon Conductor Pipe

Can be furnished in either Galvanized Iron or Copper.
It is made from galvanized iron in 10-ft. lengths, without a cross seam; from copper in 8-ft. lengths.

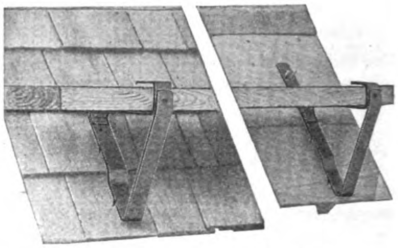
American Rolling Mill Co., MIDDLETOWN, OHIO.

Every Carpenter Appreciates Labor Saving Devices

Write for Circular of our



BRACKET HANGER
AND
ROOF BRACKET



25,000
Have Been Put in Use
Last Year

Satisfaction Guaranteed

WAGNER MANUFACTURING CO., Dept. F. **Cedar Falls, Iowa.**

I Procure Patents that Stand the Test of Competition

You would not accept a weak deed to land. Why accept a weak PATENT DEED to your INVENTION? My Booklet "About Protecting Inventions in the United States" sent to any address. Ask for references.

Circular on Trade-Mark Registration sent on receipt of request.

GEO. R. HAMLIN, Patent Attorney,
800 H. Street, N. W.
WASHINGTON, D. C

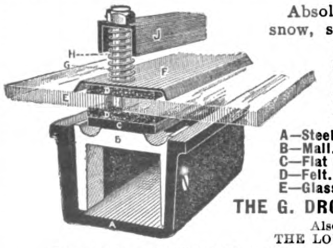
ALL KINDS OF
ELEVATOR CARS AND ENCLOSURES

Bank and Office Railing.

Send for Catalog.

FRED J. MEYERS MFG. CO.
HAMILTON, OHIO

THE "ANTI-PLUVIUS" SKYLIGHT



Absolutely and permanently impervious to rain, snow, sleet or dust without putty or cement. With bridge arrangement for walking on the skylight without danger of breaking the glass. Specially adapted for large buildings and shops where there is always more or less vibration.

A—Steel Supporting Bar.
B—Mall. Iron Bridge.
C—Flat Iron.
D—Felt.
E—Glass.
F—Copper Sheet Cap.
G—Coil Galv. Brass Spring.
H—Galv. Brass Stud.
J—Bridge (for walking on skylight).

THE G. DROUVÉ CO., Bridgeport, Conn., U. S. A.

Also Manufacturers and Erectors of
THE LOVELL WINDOW OPERATING DEVICE.

Inquiries Solicited and Estimates Cheerfully Furnished.

ARCHITECTS

Desiring to "brush up" for more responsible work should fill out and send this advertisement to us to-day and receive our 200 page handbook (FREE) describing our Architectural course and over 60 others, including Architectural Engineering, Contractors' and Builders' course, Carpenters' course, Electrical, Mechanical and Steam Engineering, Heating, Ventilation and Plumbing, Architectural Drafting, etc.

American School of Correspondence
Chicago, Ill.

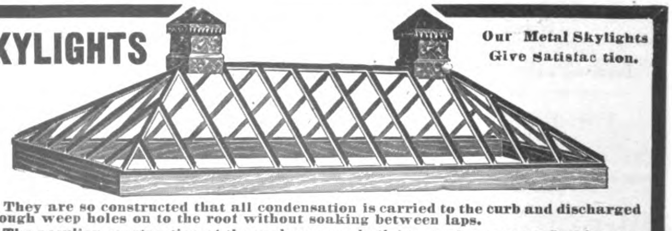
Name..

Address..

City and State..

C. & B. 4-06

SKYLIGHTS



Our Metal Skylights Give Satisfaction.

They are so constructed that all condensation is carried to the curb and discharged through weep holes on to the roof without soaking between laps.

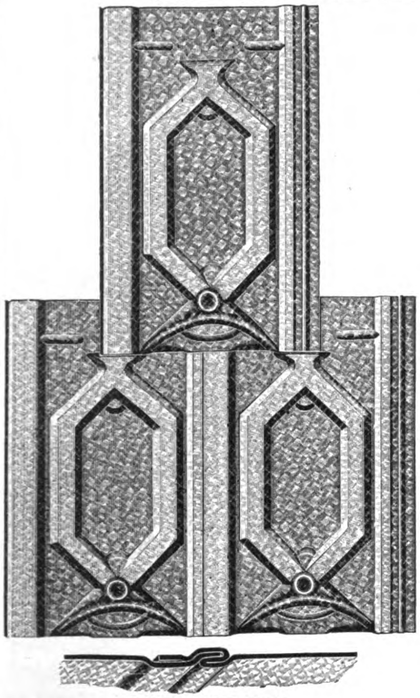
The peculiar construction of the curb on our skylights renders counterflashing unnecessary.

Frames of galvanized iron or copper, with glass of any kind or thickness.

Write for our New Cornice, Skylight and Ornament Catalog.

THE CANTON STEEL ROOFING CO., Canton, Ohio

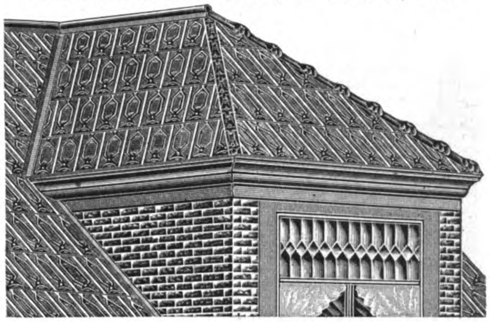
NO MATTER WHAT KIND OF METAL ROOFING YOU WANT, WE MAKE IT—WRITE TO US.



DIXIE SHINGLES
Sizes—7x10 in., 10x14 in., 14x20 in.
TIN GALVANIZED AFTER FORMING.
TIN PAINTED RED.

DIXIE METAL SHINGLES

For Roofs, One-Fourth Pitch or More, Gables, Manzards, Bay Windows, etc.



MANUFACTURED BY

WHEELING CORRUGATING CO.

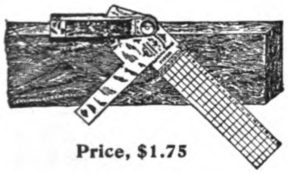
WHEELING, W. VA.

Packed in boxes containing sufficient quantity to cover one square.

We Ship Quick. Large Stocks in all our Warehouses.

BRANCH OFFICES AND WAREHOUSES:

New York City - - 47-51 Cliff St.
Chicago - - 23-27 N. Clinton St.
St. Louis - 112, 114, 116 So. Eighth St.
Philadelphia - 402, 404, 406 Race St.
Boston, Mass. - 132 and 134 Pearl St.
Chattanooga, Tenn. - - King St.



Price, $1.75

TOPP'S FRAMING TOOL.

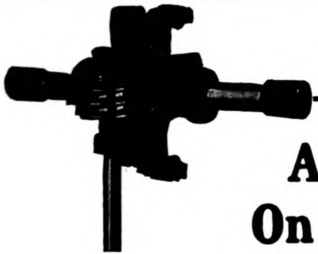
A PERFECT TOOL and the only Tool for the purpose ever invented.

Saves from 8 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

Write for booklet. Address the manufacturers,

G. A. TOPP & CO., - Indianapolis, Ind.

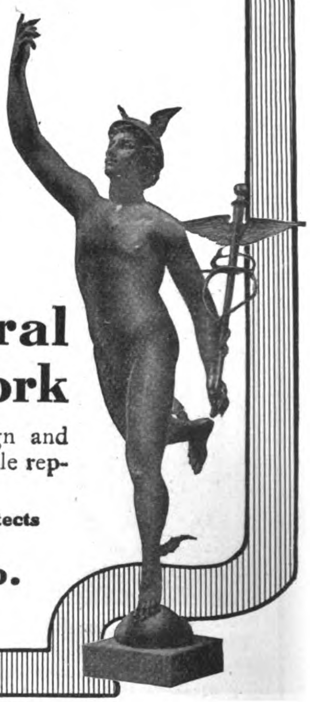


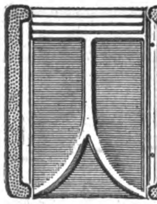
Another Hint On Ventilation.

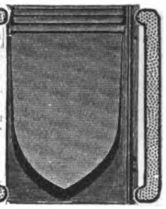
Let's take it for granted you want to operate runs of sash in a monitor: How shall you place the operating rod? With our device, place it anywhere. Bring it down the post or carried along the roof line and down the side. This gear will do the work from anywhere at any time.

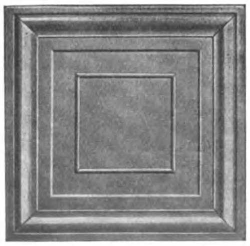
Catalogue X-V.

LORD & BURNHAM CO.
1133 Broadway, cor. 26th St., New York.
Boston Branch: 819 Tremont Building









GET OUR PRICES ON

METAL CEILINGS,

TIN PLATE,

EAVES-TROUGH, CONDUCTOR PIPE,

CHARCOAL IRON TIN,

CORNICE, SKYLIGHTS, FINIALS, ETC.,

BEFORE BUYING.

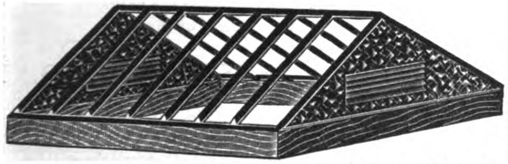
THE ELLER MANUFACTURING CO., - Canton, O.
Successors to J. H. ELLER & CO.

Combines durability, low price, ease of application, fireproof qualities and sightliness, just what the buyer of roofing material demands.

The cheapest way to repair old shingle roofs is to cover with **PERFECTED GRANITE ROOFING.**

SEND FOR PHOTO PAMPHLET.

Eastern Granite Roofing Co., Irving Building, New York.



ART METAL CEILINGS

Exclusive and Artistic Designs appropriate for any style of architecture.

All Styles Galvanized and Copper Skylights, Cornices, Finials, Crestings, Ventilators, Metal Shingles, Roof Gutters, all styles painted and galvanized Iron Roofing and Siding, etc. Write for Catalogue and Prices. Estimates free.

Kanneberg Roofing & Ceiling Co.,
Manufacturers,
CANTON, OHIO.

PRODUCERS OF

ROOFING SLATE

SLATE BLACKBOARDS.

THE E. J. JOHNSON CO.
38 Park Row,
New York.

Quotations delivered anywhere.

Slaters' Supplies, Snow Guards.
Write for Price Book.

DO YOU WANT THE BEST

DRAWING TABLE

made? If so send for illustrated catalogue and prices.

R. E. KIDDER,
22 Hermon Street, Worcester, Mass.

PLUMBERS' SUPPLIES
AT WHOLESALE.

If you need anything in my line, and wish to **SAVE 20 to 40 Per Cent** on every article, write for my free illustrated Catalog. Shipments promptly made from a very complete stock of guaranteed goods. Small orders are as carefully handled as large ones.

B. C. KAROL, 235 W. Harrison St., Chicago, Ill.

Useful Pamphlets

SIZE 5½ x 8 INCHES.

ILLUSTRATED.

25 Cents Each, Postpaid.

Reading Architects' Drawings.
Practical Suggestions for young Mechanics. 29 pages. .2

Blue Print Making.
Embracing Directions for Constructing the Printing Frame, Preparing tne Paper, and Making Prints of Various Kinds. 28 pages .. .25

House Chimneys.
A Series of Articles and Letters on Chimney Troubles and their Remedies. 62 pages ...... .25

Easy Lessons in Roof Measurements.
Twelve Short Lessons on Figuring from Architects' Drawings the Amount of Material Required to Cover a Given Surface in Flat, Hipped or Irregular Shaped Roofs. 31 pages .25

Domestic Electrical Work.
Concise and Practical Explanations on How to Wire Buildings for Bel's, Alarms, Annunciators and for Gas Lighting from Batteries. 55 pages 25

David Williams Company
PUBLISHERS
14-16 Park Place.
NEW YORK.

YOU CAN'T BEAT IT

For the Investment of 25c.

Use the A. B. C. SCHEDULES, or ITEMIZED BLANK ESTIMATING FORMS to advantage and profit, for the use of

CONTRACTORS AND BUILDERS

These Schedules are superior to anything of the kind already offered for sale. Not a text book on estimating, or a series of tables, but just simple, common sense Blank Forms, giving a complete list of all items entering into the construction of a building.

Be Enthusiastic and Convinced by Investigating

There is a separate and complete schedule for each of the following trades:

Carpenters — Masons — Plumbers — Painters

A sample copy of the schedule covering any of these trades for 25c.—A complete book (one of each series) ONE DOLLAR.

THE GEM PUBLISHING CO.
P. O. Box No. 14. BROOKLYN, N. Y.

Better Cisterns—Why?

To protect the health of every member of your family. Medical experts have pronounced the brick and wood cistern to be the cause of many cases of sickness.

A Cistern to be perfectly sanitary must be made so tight that no impurities can possibly get through. This can only be accomplished by using the steel cist

O. K. Harry Steel Works,
2341 Papin St., St. Louis, Mo.

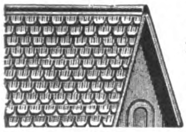
"STAR ENCAUSTIC TILE CO.,"

MANUFACTURERS OF

Superior Unglazed Encaustic Tile

For Floors in Stores, Churches, Depots, Kitchens, Halls, Porches, &c.

Office and Factory, Bluff Street, near Gist,
PITTSBURG, PA.



Carpenters

Do you want work laying Montross Metal Shingles? If so—

Write to-day to

Montross Metal Shingle Co., CAMDEN, N. J.

The
Carpenter's Guide

By A. F. Barker

A Manual of Terms Used in Architecture, Carpentry and Building

A HANDY book of terms and concise definitions arranged in alphabetical order—includes reference to the features of the various architectural styles.

178 Pages
Flexible Cloth Cover
75 Cents, Postpaid

David Williams Co.
14-16 Park Place, New York

25 feet wide—lower ceiling 12 feet in clear.

Net price F. O. B.	St. Louis, Mo.	$209.00
" "	New York, N. Y.	238.00
" "	St. Paul, Minn.	229.00
" "	Denver, Colo.	268.00
" "	Dallas, Tex.	253.00

Net price F. O. B.	St. Louis, Mo.	$187.00
" "	New York, N. Y.	212.00
" "	St. Paul, Minn.	204.00
" "	Denver, Colo.	239.00
" "	Dallas, Tex.	225.00

Galvanized Sheet Steel Fronts

The designs presented herewith illustrate our complete and modern store fronts. The prices include the steel sill course, steel vestibule plate, steel angle columns for covering end walls, steel intermediate box columns; show sash, store doors, transoms, door posts, box window frames with sash of white pine 1¾ in. thick; all glass for same of double strength; galvanized iron work above first-story columns.

We make and ship over 800 fronts annually from 20 to 300 feet in width and from one to five stories high. Having given the manufacture of complete fronts our most careful study for over thirty years, they are now the best, cheapest and most elaborate in the market. Owing to their simple and practical construction, any mechanic, whether experienced in this particular line or not, can erect them, aided by a set of full-size details and instructions that we furnish. We desire to introduce this class of work in every city in the United States, and solicit the correspondence of architects, builders and others contemplating the erection of buildings. Send for references, full descriptive catalogue and discounts. **Established 1846.**

MESKER & BROTHER,
421-519 S. SIXTH STREET - - - ST. LOUIS, MO. U. S. A.

THE NEW YORK STEEL CORNER PLATE CO.

—SUPPLY—

The Parker Steel Corner Bead for the Protection of Plastered Corners

Outlines a perfect corner. The best Corner Bead in the market. Fits any ground.

Endorsed by Leading Architects, Builders and Plasterers.

Telephone
876 Madison Square.

All communications
to 1135 B'way, N. Y. C.

SPRING STYLES

There is fashion in paints as well as in clothing. Repainting may be from desire for change as well as from necessity. If a different style in house-dress is desired, what so convenient, so economical as a high grade prepared paint based on OXIDE OF ZINC? Where too such variety of choice?

FREE
Our Practical Pamphlets:
"The Paint Question."
"Paints in Architecture."
"Specifications for Architects."
"French Government Decrees."
and
"Paint: Why, How and When?"

THE NEW JERSEY ZINC CO.,
71 Broadway, - - New York

We do not grind zinc in oil. A list of manufacturers of high grade zinc paints will be furnished on application.

Walters Metal Shingles and Tile
Will last as long as the building they cover.
Rain, Rust and Fire Proof.
Write for catalogue, samples and prices.

National Sheet Metal Roofing Co.,
JERSEY CITY, N. J.

$105 FOR STORE ELEVATOR

(ELECTRIC)

COMPLETE, READY TO ERECT, MADE BY THE HUNDRED. SIMPLE IN CONSTRUCTION. EASILY CARED FOR. OTHER STYLES AND PRICES TO SUIT.

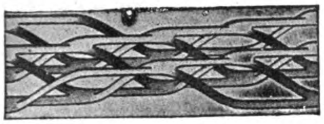
The Warner Elevator Mfg. Co., 2100 Valley St., CINCINNATI, O.

New York Office, 2032 Park Row Bldg.

$105

Kuhne's Truss Metal Lath and Structural Element

Steel Concrete



Best Concrete Binder, Self-centering—For General Fire-Proof Constructions, such as Partitions, Floors, Stairs, Outside Walls, Roofs, Sidewalks, Sewers, Tanks, etc. Patented January 1, 1901.

(CATALOGUES ON APPLICATION.)

TRUSS METAL LATH CO., 15-25 Whitehall St., New York City

MANUFACTURING AND SALES DEPARTMENT:

GOFF, HORNER & CO., Limited, Frick Building, Pittsburgh, Pa.

MILLS AT ZANESVILLE, OHIO.

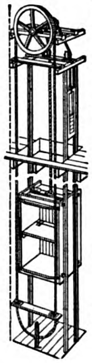
Dexter Portland Cement.

HIGHEST STANDARD ATTAINABLE
FOR PAVEMENT AND CONCRETE
WORK.

SAMUEL H. FRENCH & CO.,
Sole Agents,
PHILADELPHIA.

Established 1844.

DUMB WAITERS AND HAND ELEVATORS.

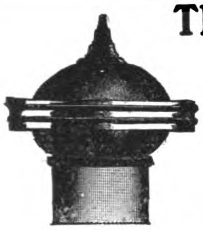


Trunk Lifts,
Invalid Lifts,
Carriage Elevators,
Freight Elevators,
Sidewalk Elevators,
Hatchway Hoists.

All of most improved design and construction.

Sedgwick Machine Wks..
88 Carroll Street,
POUGHKEEPSIE, N. Y.
New York Salesroom, 128 Liberty St.

Catalogue on application.
Estimates on request.



THE "GLOBE" VENTILATOR

In Brass, Copper, Galvanized Iron and with Glass Tops for Skylight Purposes. Also

"Globe Ventilated Ridging"

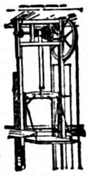
For Barns, Residences and Buildings of every character. Far superior to a Cupola.

Send for Description and Price List.

Manufactured by **GLOBE VENTILATOR CO.** Troy, N.Y.

Improved Quick and Easy Rising
Steam, Electric and
Hand Power Safety

ELEVATORS
AND DUMB WAITERS.
Automatic Hatch Gates.
Send for Circulars.



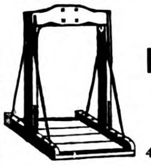
KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kimball Elevator Co., Cleveland, Ohio, 245 Vincent St
Branch Offices:
120 Cedar St., New York. 108 11th St., Omaha, Neb

MORSE HAND ELEVATORS
and DUMB WAITERS

Safe Easy Running Durable

Shipped complete, with or without lumber, with drawings and instructions for erecting. Correspondence solicited.

MORSE, WILLIAMS & COMPANY
PHILADELPHIA ATLANTA BOSTON



ELEVATORS AND DUMBWAITERS
that can be placed in position by any carpenter.
Catalogue Free.
Energy Elevator Co.
407 Cherry St., - Phila., Pa.

$2.00 Remitted in any safe way will secure you a copy of the new book

STRENGTH OF BEAMS, FLOORS AND ROOFS

By F. E. KIDDER

With a copy within reach you will never lack direction for designing and figuring a wooden truss of any ordinary type.

Not the least important, a good many wrong ways and fundamental mistakes which the Builder is apt to fall into are pointed out.

Simple Methods
No Intricate Formulæ

222 Pages. 164 Illustrations.

DAVID WILLIAMS CO.
Publishers
14-16 Park Place . . New York.

All phases of Plumbing, Drainage and Water Supply are expertly treated in the new book

Plumbing and House Drainage Problems.

THE SIXTH EDITION REVISED AND ENLARGED.
309 Pages, 197 Illustrations. TWO DOLLARS, PREPAID.

DAVID WILLIAMS COMPANY 14-16 Park Place, New York.

Digitized by Google Original from UNIVERSITY OF MICHIGAN

LOOK OVER THE SIMONDS SAWS, and you will see the points of advantage.

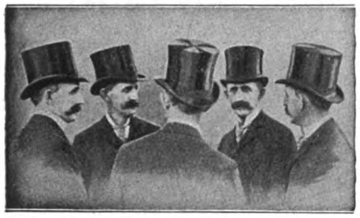
FIRSTLY, they are ground a true taper, which enables the user to run the Saw with very little set.
SECONDLY, each Simonds Saw is handled by a mechanic who thoroughly understands the hanging of the Saw, which guarantees this most important feature.
THIRDLY, the filing and setting of the Simonds Saws are carefully done, and thoroughly inspected, so that the Saws, on leaving the factory, are ready for work.
FOURTHLY, the steel used in the manufacture of the Simonds Saws is a high carbon crucible steel, and will hold its cutting edge much longer than the ordinary steel generally used.
FIFTHLY, each Saw is put up in a separate case, thus avoiding fingering and rust marks commonly found on Saws that are not encased properly.
SIXTHLY, because every Simonds Saw is guaranteed thoroughly.

Any mechanic trying a Simonds Saw, and not finding same satisfactory, may return the Saw, either to the dealer or to the Simonds Mfg Co., and get either a new Saw or money paid back.

SEND FOR CATALOGUE AND PRICE LIST.

SIMONDS MFG. CO.,
Fitchburg, Mass Chicago, Ill. New York, N.N.
Portland, Ore. Seattle, Wash.
SIMONDS MFG. CO., Ltd., New Orleans, La.
SIMONDS SAW CO., San Francisco, Cal.

STANDARD MINERAL WOOL



LOOKING ALL WAYS FOR BUSINESS
COLUMBIA MINERAL WOOL CO.,
Room 918, 112 Clark St., CHICAGO.
Samples and Circulars Free

Fireplace Mantels
MADE OF
Ornamental Brick
$12 and up.

Last longest—look best—are not too costly. There's no other kind so good—so pleasing. Our Sketch Book tells all about them. Write for it.

PHILA. & BOSTON FACE BRICK CO. - P. O. Box 8613 - BOSTON, MASS.

FOR SALE!

The most successful hardwood and parquetry business in Philadelphia, established over five years, centrally located, highest class of trade. Examination solicited. An excellent opportunity for a hustling young man.

WALTER D. STEWART,
522 Walnut Street,
Philadelphia, Pa.

OUR FINE HARDWOOD FLOORING
SHOULD BE THE BEST.

We have been making PARQUETRY for TWENTY YEARS. We have our own saw mill and timber tracts and two factories. Send for our trade discounts and our Design Book No. 5.

WOOD-MOSAIC FLOORING CO.
ROCHESTER, N. Y. NEW ALBANY, IND.

WANTED

for large factory, energetic capable Superintendent, thoroughly experienced in the manufacture of veneered and solid pine doors. Good salary to right man.

Address "SUPERINTENDENT,"
Care of *Carpentry and Building*, New York.

Bolcoa
TRADE MARK
ETCHING FLUID

Will mark your tools in a manner impossible to erase, without destroying the article itself. Protect yourself against loss and theft. Easy of application. **Price 25 cents.** We handle a full line of tools. Let us know your wants.

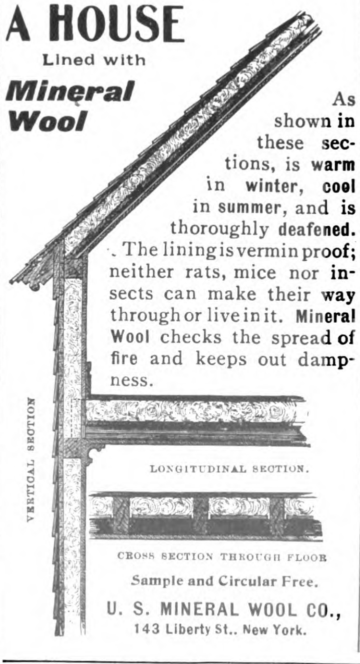
Reed & Auerbacher Co.
229 Bowery, N. Y.

NEW SELF-SETTING PLANE
Sample sent as per circular if not kept by dealers.
GAGE TOOL CO., Vineland, N. J.

Irons **warranted;** Plane is **returned** money **refunded.**

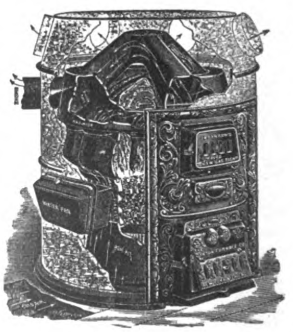
A HOUSE
Lined with
Mineral Wool

As shown in these sections, is warm in winter, cool in summer, and is thoroughly deafened. The lining is vermin proof; neither rats, mice nor insects can make their way through or live in it. Mineral Wool checks the spread of fire and keeps out dampness.



Sample and Circular Free.
U. S. MINERAL WOOL CO.,
143 Liberty St.. New York.

The Boynton Furnace Co.
SOLE MFRS. OF
Boynton's Furnaces,
Ranges,
Hot Water Heaters,
Steam Heaters, Etc.



207-9 Water Street, New York.
147-9 Lake Street, Chicago.

EVERY Builder who reads, investigates and progresses will have a copy of Kidder's Strength of Beams, Floors and Roofs. $2.00 prepaid.
DAVID WILLIAMS CO. 14-16 Park Place, N. Y

CARPENTRY AND BUILDING

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

APRIL, 1906.

New York's Latest Hotel.

The imposing structure which for the past few years has been in process of construction at the corner of Broadway and Forty-second street, New York City, is now expected to be opened for business sometime in October next. The building is the Hotel Knickerbocker, 15 stories high, fireproof throughout, has 556 sleeping rooms, 400 bathrooms and will accommodate about 1000 people. On the top floor are separate quarters for the servants. The hotel will have its own refrigerating, electric lighting and steam heating plants in the sub-basements, and some idea of the size of the electric plant may be obtained from the statement that the hotel will be equipped with over 18,000 electric lights. The hotel is constructed of terra cotta and limestone and is finished in the French Renaissance style of architecture. The interior decorations are on an elaborate scale and a goodly portion of the past two years has been spent in the execution of this feature of the work. The main lobby contains some of the finest marble to be seen in any building in America. Beautiful columns of solid Pavonazzo marble rise from marble floors. The counters are a combination of this and of Istrian marble, which comes from Istra, on the shores of the Adriatic. The floors are in varied patterns of white Italian, Sienna and French Vert Maurin. In the dining room Istrian marble of a beautiful buff color is principally used. The floor is of French green and pure white Italian marbles. The walls and cornice are of Caen stone. The flower room has an Istrian marble wainscot with Caen stone above the wainscot, molded and paneled. The barroom has French green marble extending across the front of the bar and around the columns. The floor is of marble mosaic, with French green marble border. The corridor floors are covered with mosaic and the walls lined with marble wainscot. The plumbing marble is of the finest quality blue-veined Carrara marble. The bathrooms, of which there are some 400, are lined with cream enameled tiles. The equipment of the hotel will include 11 Standard plunger elevators, while specially constructed boilers have been installed with a view to insuring absolute safety and immunity from explosion.

Sheet Metal in Building Construction.

In view of the prominence which substitutes for wood are at present attaining in connection with building construction it is interesting to note the extent to which sheet metal is being utilized in this field of industry. With the increasing cost of materials formerly employed, with the more rigorous exactions of the insurance authorities and with the general willingness to adopt the promising improvements of these fast moving times sheet metal has come to be largely used for outside protection, for interior embellishment, for sanitary wall coverings and for household utensils. The present extensive adoption of sheet metal has been a gradual one, the interesting point being the widely different purposes and the common occurrence in our daily life of different metals in sheet form. The tin roof is no new thing, nor is the corrugated siding and roof covering, nor the decorative sheet metal wall and ceiling coverings. But the last are apparently coming into a notably increasing favor, largely the result, without doubt, of closer attention to artistic effects in the stamped designs. The fire resisting qualities of metal coverings have also had considerable to do with the development of the building sheet metal business, and the metal window and door is getting to be a common thing. The enhancement in value of woods suitable for interior building use is also becoming so rapid that the metal framed and protected openings in buildings are calculated to grow in popularity. Finally in building construction the cornices of granite, brick or sandstone, which delighted architects, have now in a large measure been superseded by those of copper and other sheet metals, which, moreover, answer requirements of lightness, of susceptibility to elaborate decoration, if desired, and of moderate cost. In the matter of home equipment one has seen the substitution of the heavy cast iron tea kettle by that of light metal. The old open fire place with its brick oven requiring a day's fire to thoroughly warm it up gave way to the cast iron stove or range, and though cast iron plates can be regarded as sheet metal the cast iron productions are now accompanied by sheet steel in stoves for both heating and cooking. Sheet metal has extended in fact to the heating apparatus for the central house heating system, where now sheet steel radiators are available for steam and hot water heating and even for direct radiation with hot air from the warm air furnace. The enameled sheets for kitchen and bathroom walls, with their value from a sanitary standpoint and their remarkable possibilities with respect to decoration, are another case in point, and the list could be continued almost indefinitely.

Regulating Assignments of Wages.

In some localities the practice of workmen assigning their wages has become such an annoyance to employers that those having a large working force have been compelled to post notices making such assignment sufficient cause for immediate dismissal. A bill before the Massachusetts Legislature apparently contains at least a partial antidote to the evil in its provision that a standard form of assignment shall be employed and that such transactions to be binding on the borrower must be publicly registered. This bill is being fought with much earnestness by those whose business depends upon assignments of wages to secure sales on the installment plan or loans of money. They assert that it would destroy their business if it should become a law. If this is true the law would certainly fill a great need. If an employee is actually compelled to assign his wages to secure necessities no more harm could be imposed by publicity than results to-day from the necessity of recording mortgages on personal property as well as on real estate. Needed protection would be accorded to a large percentage of those persons who avail themselves of what seems an easy way to secure credit or loans of money and who sign their names without having the remotest idea of the meaning of an assignment of wages, and oftentimes without knowing that they are actually depriving themselves of their income. While ignorance is no excuse in the eyes of the law, neither is there in-

justice in a law which prevents one class of persons from taking advantage of the weaknesses of another.

Present and Past Cost of Building.

In view of the advances which have been made in recent years in the cost of labor and of materials entering into building construction the following from the *Record and Guide* will be found of more than ordinary interest and value:

Hemlock lumber has been raised to $22 per M., base price. Ten years ago the schedule for hemlock was exactly one-half as much. One year ago it was on a $17 base, and since the first of the year the base price has been raised by official promulgation $2 per M. The announcement of the rise in hemlock suggests a consideration of the changes in the cost of other materials in the course of a decade. Random cargoes of narrow spruce were obtainable for $13 per M. in the spring of 1896, but to-day they command a minimum of $24. White pine dressing boards sold for $23 ten years ago, while at the present time they are quoted to dealers at a minimum of $41.50. Yellow pine flooring sold for $16 in 1896; plain oak for $35; No. 1 whitewood (inch stock), $30; common hard brick, $5.50; lath, $2; Rosendale cement, 80 cents; Atlas Portland, $2.50. This present month typical prices are, for clear plain sawed white oak flooring, $53 to dealers; whitewood (No. 1), $48; common hard brick, $11, and lath, $5 to $5.50. Thus the cost of several fundamental materials, as well as hemlock, is either double what it was ten years ago, or very nearly so; and this is also true of some materials not here named.

Wages in 1896 were, for bricklayers, 50 cents per hour; for plasterers, $4 per day; carpenters, $3.50; plumbers,, $3.50 to $4; painters, $2.50 to $3.50; and for stone setters, $4.50. At this present time bricklayers receive 70 cents per hour, which is a 40 per cent. increase. Plasterers earn in 1906 $5.50 per diem, which is an advance of 37.5 per cent. in ten years. Stone setters and cutters, receiving $5 at the present time, have been raised 11 per cent. Plumbers now command $4.50 for a day's work, which is 28 per cent. more than in 1896. Painters. $4 to $4.25, which is an advance of 50 to 60 per cent., and carpenters drawing $4.40 are 28 per cent. better off than in 1896.

Therefore, for the trades here specified, there has been an average increase in wages of 36 per cent., and after taking into account the shorter hours of labor in many trades it will probably be found that, apparently, the cost of the labor required for erecting a medium class Manhattan building totals about 35 per cent. more than in 1896; and in running up an elevator apartment house, which is a type which may be selected as representing an average construction, the item of labor will represent very nearly 35 per cent. of the cost of the building, exclusive of the land; and most of the remainder, but not all, will go for building material.

In the year 1903 the results of an extended investigation of the cost of labor and materials were given at length in the *Record and Guide*, and showed an apparent increase in the cost of construction in Greater New York in five years of 30 per cent. This final result was not arrived at entirely by arithmetical processes, for the reason that elements which cannot be reckoned in figures must be taken into account. The methods of construction, for example, have changed in ten years; working forces are better organized; the work is more scientifically planned and arranged for in advance, both by the contractor and the architect, and new materials have come forward, as, for instance, Portland cement, which has made a great difference. Less wood is used and wasted, and various substitutes have taken the place of more expensive materials to a large degree. If a building were erected in precisely the same way in 1906 as in 1896, with the same materials and the same methods and all the materials in the same quantity and bearing the same proportion to the whole, then it might be possible to figure out from labor schedules and price-lists of building materials how much more it costs to build in 1906 than it did 10 or 20 years ago. But the fact is that the only way to ascertain with accuracy the difference in building costs is to have access to the accounts of owners and builders showing the total sums actually paid out for construction; and, strange as it may seem to the layman, after he has investigated and figured on the higher cost of labor and materials, it will be found that the cost of constructing a building of the first class, such as a Broadway office building, is not very much greater in 1906 than in 1896. In other words, taking two Broadway office buildings of the same cubical contents, one finished ten years ago and one finished this winter, it may be found that the total footings of their cost sheets do not differ 10 per cent. This is what the cost books show as to office and hotel construction.

The architect has been an important factor in keeping down the total cost of construction. He is a man of better training than ten years ago, and architectural design as a general result is nearer the ideal. Or, putting it in another way, the architect does not try to do so many stunts. So, while it is a fact that both labor and materials have advanced in cost, the improvements in design and in engineering practice, with the aid of new materials and more skillful mechanical service and organization, have tended to keep down the actual total cost of construction in Manhattan. Had wages and material prices remained the same the improvements in engineering and mechanics and the incoming of new materials would have actually lessened the cost per cubic foor for construction. Outside of Manhattan, however, a different set of circumstances prevail, and two things have combined to materially increase the cost of dwellings of moderate quality, one being the better sanitation required and the other the higher cost of lumber, of which they are principally composed, so that while in Manhattan the cost of construction may not have increased more than 10 per cent., in Brooklyn, the Bronx and beyond there has been an advance, after making due allowance for progress of the times, as affecting public taste and municipal requirements, as well as progress in mechanics—an advance in the cost of construction conservatively estimated as heretofore of about 30 per cent.

The New Barclay Building.

(*With Supplemental Plate.*)

One of our supplemental plates this month carries an illustration of one of the more recent office buildings erected in New York City, located at the corner of Duane street and Broadway. It is a striking example of a commercial structure and the picture is of value to the builder by reason of the many suggestions afforded as to the architectural treatment of the exterior of a building of this character. It will be noticed that the ornamental treatment is practically confined to the upper portion of the structure, the lower stories of brick and stone having comparatively plain surfaces. The building is 18 stories in hight and was designed by Architect Stockton B. Colt. The general contract for the erection of the building was in the hands of Marc Eidlitz & Son, and the contract for the cut stone work was executed by B. A. & G. N. Williams, all of New York City.

Officers of Western New York and Pennsylvania Association of Builders.

At the recent convention of the Western New York and Pennsylvania Association of Builders, held in Dunkirk, the following officers were elected for the ensuing year:

President, W. H. Dennis of Bradford.

Vice-presidents, J. A. Taylor of Dunkirk; E. M. Servey of Oil City.

Secretary, H. H. Osgood of Bradford.

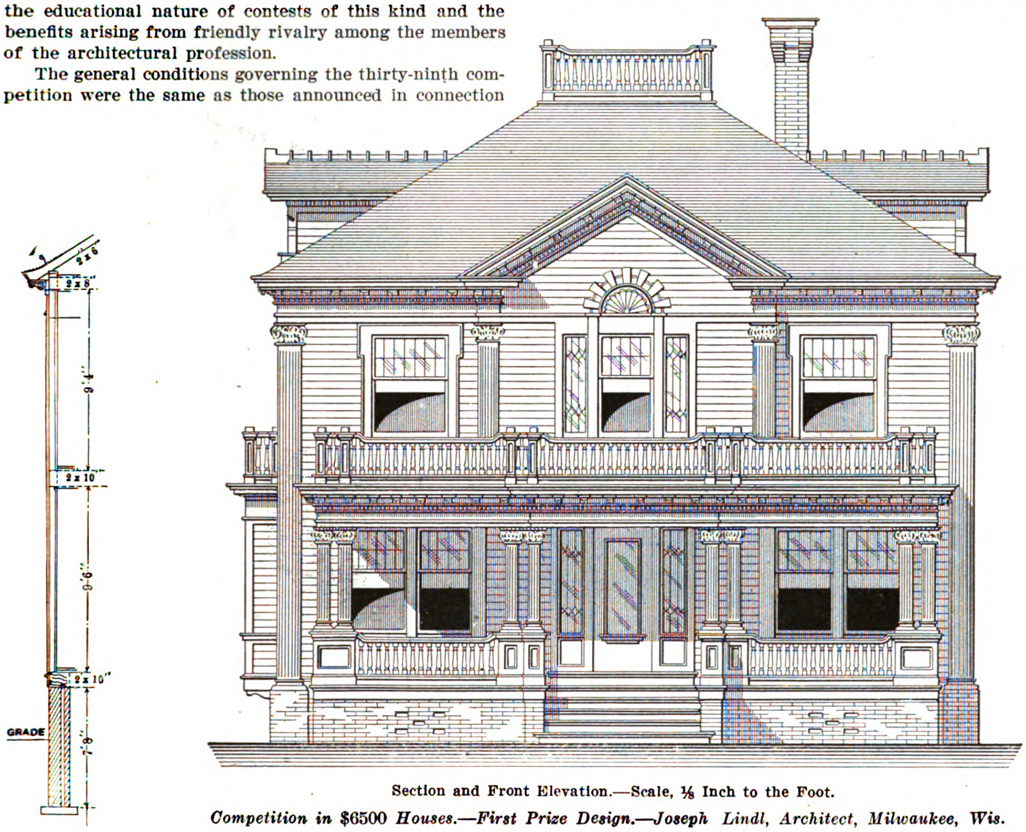
Treasurer, William Hanley of Bradford.

An Executive Committee was appointed which will select the place for next year's convention. At the banquet given on the evening of February 22, which was the last day of the meeting, the Mayor and members of the City Council were present and numerous interesting addresses were made. The meeting was a most successful and profitable gathering.

COMPETITION IN $6,500 HOUSES.

FIRST PRIZE DESIGN.

AFTER carefully considering in the light of the conditions governing the contest, the various sets of drawings submitted in the thirty-ninth competition, being that for $6500 houses, the committee of award has rendered its decision, and we take pleasure in presenting a synopsis of it herewith. At the very outset it may be stated by way of interest that the country east of the Rocky Mountains was well represented in the competition, but the extreme South and Southwest was not in evidence to the same extent as in some of the previous contests conducted under the auspices of this journal. The character of the work submitted was of a higher order of merit than heretofore, clearly demonstrating the educational nature of contests of this kind and the benefits arising from friendly rivalry among the members of the architectural profession.



Section and Front Elevation.—Scale, ⅛ Inch to the Foot.

Competition in $6500 Houses.—First Prize Design.—Joseph Lindl, Architect, Milwaukee, Wis.

The general conditions governing the thirty-ninth competition were the same as those announced in connection with earlier contests, but specifically they covered houses which could be built for $6500 in the localities from which the drawings were sent. Among other things it was stipulated that each set of drawings should be accompanied by a brief specification and an estimate of cost in detail, together with a certificate from a reputable builder to the effect that he would be willing to execute the work at the figure stated.

There were comparatively few who failed to comply with all the conditions of the contest, although some destroyed their chances for a prize by placing their names upon the drawings, while others made the estimate of cost figure a total in excess of $6500, but stated by way of explanation that the house could probably be built for less money. In some instances, while the figures of cost were within the limitations stated, their specifications called for such an elaborate finish as to bring the cost of a house so constructed far in excess of the figure called for by the competition.

We have often pointed out in connection with previous contests the fact that many authors damage their prospects for a prize by failing to furnish an estimate of cost in detail, being content simply to furnish gross figures under the headings called for by the conditions. In the present competition many fell into the same error and under the rules of the competition the committee had no alternative but to regard them as wholly out of the contest. It is to be regretted that the chances of several were greatly lessened by their failure to comply with this important requirement. It is obvious that the author who complies most fully with the requirements as regards detailed estimate and specifications should receive more favorable consideration than those who do not.

The position of the bathroom is always a feature to be considered, both by reason of the economical placing of the plumbing fixtures and the running of the piping, and in the designs submitted some rather curious arrangements were presented. In one instance the author utilized a goodly portion of the front of the second story for his bathroom, bringing it directly over the front hall, while his other plumbing fixtures were far at the rear. Many had the bathroom over the dining room; but in a well built house costing $6500 and with double and deadened floors this would not be so objectionable as in houses of cheaper construction.

The committee in its report criticised each set of plans, pointing out the good features and also those which in the opinion of its members were objections. We shall be glad to have our readers do the same, with a view to creating an interesting discussion on the planning of houses.

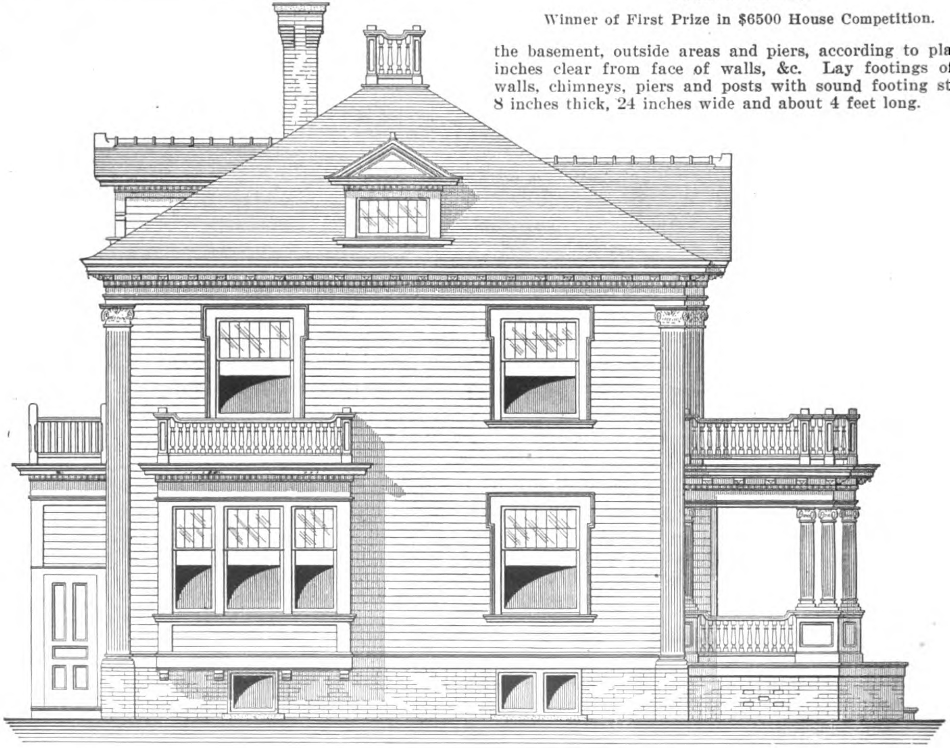
According to the report of the committee the set of drawings marked "Colonial," and submitted by Joseph Lindl, 402 Germania Building, Milwaukee, Wis., is entitled to the first prize of $250; the drawings designated by a combined T-square and triangle and submitted by Buemming & Dick, Pabst Building, Milwaukee, Wis., is entitled to the second prize of $150, and the study

designated by a sexfoil in a double circle and submitted by Alfred H. Lee, 2496 Eighth avenue, New York City, is entitled to the third prize of $100.

While not entitled to a prize there were several sets of drawings submitted which received favorable comment at the hands of the committee and which are worthy of "Honorable Mention" in this connection. These include studies contributed by D. P. Slitor, 133 South avenue, Penn Yan, N. Y.; David D. Barnes, 3 Park street, Boston, Mass.; Isaac L. Goff Company, 171 Westminster street, Providence, R. I.; C. A. Wagner, Port Jervis, N. Y., and William H. Harvey, 311 Main street, Worcester, Mass. These are of such a nature that we shall hope to publish one or more of them after the prize designs have been presented to the attention of our readers.

There are doubtless many of our readers who will be interested in becoming acquainted with the author of the first prize design, and we take pleasure in presenting herewith a likeness of him, together with a brief statement touching his architectural career. After taking a course in architecture at the International Correspondence Schools, Scranton, Pa., he four years ago entered the employ of O. C. Uehling, architect, and a year later he accepted a position in the offices of Leiser & Holst, architects, where he is at present employed as head draftsman.

We present herewith the design awarded the first prize, together with the specifications and detailed estimate of cost. In commenting upon this selection for first place the committee suggests a few changes, which in the opinion of the members composing it might be made to advantage. The vestibule might be somewhat smaller; the roof might be a trifle steeper, which would clear it of snow more readily, and the chimney should be divided so as to give separate flues for heater, range and laundry. Reference is made to the fact that the specifications call for the roof to be boarded and then shingled, but in the estimation of the committee it would be better to lay the shingles on lath, so as to avoid the tendency to decay. In many sections of the country, however, it is common practice to construct the roof as indicated by the author of the first prize design, making use in this connection of a thick building paper.



Side (Left) Elevation.—Scale, 1/8 Inch to the Foot.

Competition in $6500 Houses.—First Prize Design.

Specifications.

The following are the specifications as furnished by the author of the design awarded the first prize:

Mason Work.

Excavate and remove from the premises the ground from the basement, outside areas and piers, according to plan, 6 inches clear from face of walls, &c. Lay footings of all walls, chimneys, piers and posts with sound footing stones 8 inches thick, 24 inches wide and about 4 feet long.

JOSEPH LINDL.

Winner of First Prize in $6500 House Competition.

Mortar.—All mortar below grade shall be made of clean, sharp sand, fresh burnt lime, and one-third part Universal Portland cement. Mortar for brick above grade to be 1 part lime and 3 parts sand. Wall below grade to be plastered with ½-inch coat of Portland cement mortar. All window sills to be Bedford sand stone, with 1 inch bevel on top. Same to be 5 inches thick. All brick used to be well burned Chicago brick; for facing of walls and chimneys use $18 red press brick, laid in red mortar. Brick work shall be tied in every seventh course and worked in sound and regular bond.

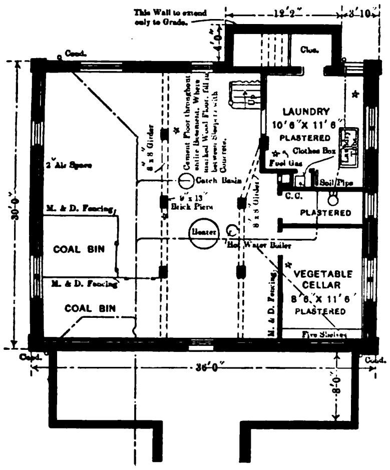
Build chimney in such a manner that in no case you

allow less than 6 inches between the smoke flues and any wood work. Flue lining to be furnished and set by the mason. In all rooms having chimneys furnish and put in stove pipe receivers with tin stoppers.

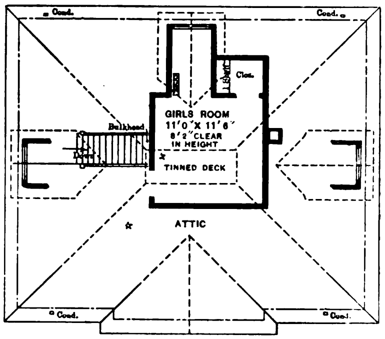
Flue Doors.—All flues shall have 8 x 8 inch cast iron doors near bottom. All to be furnished and set by the mason. Chimney to be capped with sand stone cap, as required by elevation. Provide all materials and scaffolding for the mason work and cover the work from the weather at all necessary times.

Cement Floor.

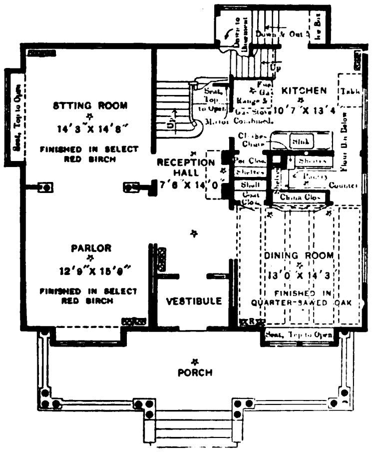
Floors to be made of 3 inches of concrete composition composed of 4 parts of clean, coarse gravel, 3 parts of coarse steam boiler cinders and 1 part best Portland cement, Whitehall, Vulcanite, or some other brand of equal merit; all to be thoroughly mixed and tamped down solid. Where cement floors are indicated finish above concrete with a 1-inch top dressing composed of equal parts of fine clean bank sand and same brand of cement as used in concrete. All to be troweled to a smooth surface and jointed into separate sections about 8 feet square. All to have proper pitch to catch basin. Where wood floors are indicated fill in between sleepers with above concrete.



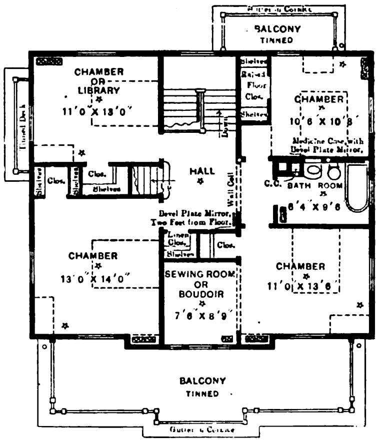
Foundation.



Attic with Outline of Roof Plan.



First Floor.



Second Floor.

Competition in $6500 Houses.—First Prize Design.—Floor Plans.—Scale 1-16 Inch to the Foot.

Lath and Plastering.

Wood Lathing.—All walls and ceilings to be plastered shall be lathed with 1¼-inch No. 1 hemlock lath, put on at right angles with studs and furring. All lath to be ⅜ inch apart, well nailed and joints broken every twelfth lath.

Mortar.—Mortar shall be made of fresh slaked lime, clean, sharp sand and cattle hair; made three days before being used and screened thoroughly through a fine sieve.

Base Coat.—Plaster to be put on so as to have a good clinch and to be well straightened; all walls to be made plumb and even and all angles sharp and regular. Mortar shall extend to the floors and close up to the door jambs and crowns.

Finish Coat.—The last coat to be the best style of Imperial, well mixed and worked, and shall not be applied until under coat is bone dry. In the foregoing manner plaster the entire first and second stories, and the finished parts of basement and attic; also plaster balance of basement ceiling one coat. In kitchen and bathroom score plastering to represent tile, that in kitchen to be 3 feet 6 inches high and that in bathroom 4 feet 6 inches high. Run a plaster cove of 14-inch radius at intersection of wall with ceiling in sitting room. Parlor, sitting room and reception hall to have a stucco center piece 3 feet in diameter, to be set exactly in the center of ceiling in the respective rooms. Estimate the sum of $12 for each center piece. Estimate the sum of $50 for a stucco cornice in parlor.

Carpenter Work.

All lumber, unless otherwise specified, to consist of good merchantable thoroughly seasoned pine, free from shakes, and must be prepared, framed and constructed according to drawings and sections. All the floor joists must be properly sized to widths and set true and level on walls.

DIMENSIONS.

	Inch.	Inch.	
First-story joists	2 x 10	16 o. c.	Pine.
Second-story joists	2 x 10	16 "	"
Ceiling joists	2 x 8	16 "	"
Rafters	2 x 6	20 "	"
Inside studs	2 x 4	16 "	"
Outside studs	2 x 4	16 "	"
Wall plates	2 x 4		

Bridging.—All joists having from 9 to 12 feet between bearings to have one row of 1 x 3 inch cross bridging, well fitted and spiked together with two 10d. nails at each end; all having from 12 to 18 feet must have two rows.

Headers and Trimmers.—All headers and trimmers to be put in double thick, thoroughly framed and spiked together, and in no case allow the timbers to come within 2 inches of the brick of any smoke flues. All window and door sills to be set double, and when over 3 feet 6 inches wide to be trussed overhead of all openings. Partitions shall be sized where required. All angles of rooms must be made solid. Partitions in basement to be No. 1 matched fencing except in finished parts. All carrying partitions to have double plates at top and single plates at bottom.

Roofs.—Board roofs with dry No. 1 pine boards, nail at each bearing with two 10d. nails. Make roofs perfectly watertight, and lay in large tins with shingle courses.

Shingles.—Cover the entire roofs with best quality extra A red cedar shingles, laid 4¼ inches to the weather and properly lapped.

Floors.—The floors shall be well seasoned and perfectly dry, dressed, tongued and grooved and blind nailed to every joist, and smoothed after they are laid. The floors to be of the following kinds; viz.: Attic and cellar floors to be "C" flooring, pine, 4-inch face. All floors to extend to outside or roof sheathing. Floor of porch to be 1½ inches thick, 2½-inch face, "C" stuff, joints laid in white lead.

Hardwood Floors.—The entire first and second stories to have hardwood floors. Same to be 2¼-inch face patent dressed, clear, even color maple for parlor, sitting room, reception hall, vestibule and kitchen. Entire second story to have clear maple floor. All flooring to be well laid and protected with building paper. Dining room to have best oak floor.

No Floors to Be Laid Until Roof Is On.

Line the floor joists of first and second stories with No. 2 pine M. & D. fencing, laid diagonally, and cover with one layer of heavy two-ply R. & B. building paper.

Gutters.—Gutters to be so graded as to throw the water into the conductors.

Outside Finish.—Outside finish of all kinds will be of dry seasoned "C" select pine, and all parts not otherwise covered to have 4-inch "B" white pine siding, exposed 3 inches to the weather. Pilasters to be made as shown of 1¼-inch pine, fluted, as required by drawings.

Sheathing.—Outside sheathing will be of No. 2 pine, M. & D. fencing, nailed at each bearing with two 10d. nails and covered with heavy two-ply R. & B. building paper. Ceiling of balcony to be ceiled and molded, as shown on drawings, with "V" jointed ceiling and ⅞-inch paneling boards and 4-inch cove in corner.

Windows and Sash.—All windows shall have 1½-inch meeting rail, and those having two sash each will have them hung with best Silver Lake cord, run over large axle pulleys and properly balanced. Sash for plate glass to be 1¾ inches thick.

Window Frames.—All outside window frames to have pockets for weights. Pulley stiles to be ⅞ inch thick and blind stops ⅞ inch thick; parting strips to be ½ inch thick and sash stops ½ inch thick, molded on the inside. Sills to be 1¾ inches thick and laid 2 inches bevel per foot. Outside casings to be 1⅛ inches thick and 4 inches wide, unless otherwise shown on drawings.

Door Frames.—Door frames that show when finished shall be of "C" select pine. Jambs to be 1⅛ inches thick, rabbetted on inside. Sills to be 1¾ inches thick and made of red oak. All inside window and door jambs to be ⅞ inch thick, of material to match finish of rooms.

Basement Framcs.—Basement frames to be made of select dressed plank, with rabbet on inside and have 2-inch face casing.

Doors.—All doors in building to be made in six cross panels, of materials to match finish of rooms, 1⅜ inches thick. unless otherwise specified. Sliding doors to be 1¾ inches thick and hung with Luitink's parlor door hangers. Main entrance door to be of select oak, 2 inches thick. Dwarf doors to pantries, &c., to be panelled doors, 1⅛ inches thick.

Inside Finish.—All inside finish to be made according to the details, or as otherwise specified. Basement and closets to have bevel casings 4 inches wide and base 6 inches high. Make all casings and base as shown on detailed drawings. Dining room to have panelled wainscoting 6 feet high and beamed ceiling, as required by detailed drawings. Parlor and sitting room to be finished in select red birch. Dining room in quarter sawed oak; reception hall, vestibule and staircase in oak. Kitchen in pine. Entire second story in plain select even color birch. All window stops to be fastened with round headed brass screws.

Stairs.—Risers to be nailed in back; balusters dovetailed to treads and treads and risers housed into wall-strings and thoroughly wedged and glued in place. All box stairs to have wall rails. Rails secured to newels and at joints by rail bolts. Soffit and exposed side of main staircase to be panelled. Basement and attic to have pine stairs, basement stairs to have maple treads. Pantries to be finished as shown and described on plan. Closets will be fitted up with ⅞ inch, 14-inch shelves and clothes hooks placed 8 inches apart on ⅞ x 8 inch molded strips. Also build drawers under shelves, as required by plans. Vegetable cellar to have shelves, as shown. Basement partitions to have stud partitions and same shall be plastered on both sides, unless otherwise marked.

Miscellaneous.—Do all carpenter work of every description; also do all necessary jobbing and cutting for other contractors that may be required for the entire finishing of the work. All nailing in the interior finish to be done with finishing nails and as far as possible concealed from sight. Picture moldings to match finish to be put in all rooms excepting kitchen, bathroom, pantry and closets.

Hardware Trimmings.—All sash hung with weights will be secured with sash locks. Estimate the sum of $70 for all hardware trimmings and the sum of $50 for a mantel. Furnish all sliding door hangers sash weights, cords, pulleys, nails, &c., exclusive of the above mentioned trimmings.

Galvanized Iron and Tin Work.

Gutters.—Gutters to be lined with No. 26 galvanized iron, lock-jointed, soldered and nailed and to be connected into the conductors.

Flashing.—Window and door caps and all projections, flashing around chimney, and all other parts that are liable to leak, shall be lined with Taylor's Old Style I.X. tin, well soldered and nailed.

Tin Roofs.—The roof over porch and rear stairhouse shall be covered with 14 x 20 inch Taylor's Old Style tin, well nailed and to have flat seams, well soldered and lined with oiled roofing felt, sufficiently lapped. Use no acid and clean off all rosin as soon as tinning is done. All tin work to be painted on under side with one good coat of best mineral paint. Also furnish and set a 3-inch diameter vent pipe for mantel. Conductors to be corrugated No. 26 galvanized iron, 3 x 4 inches, well secured to building with galvanized iron holdfasts, neatly fitted.

Heating.

The building is to be heated by the hot water system, the radiation being sufficient to heat the building to 72 degress when outside temperature is 20 degrees below zero. The heating contractor is to furnish his own specifications and must guarantee his work to do the service as specified.

Plumbing.

The building will be located on the southwest corner of the street, 25 feet back from lot line, and building to face north.

Drains.—Do all excavating and refilling of trenches to lay all drains and water pipes. All drain pipes in and outside of building to be of vitrified clay, laid with proper pitch and connected with main sewer in street and provided with all necessary traps, heads, Y's, &c., and extended to all points where marked on plans. At conductors turn ends to top of grade; each upper length to be of iron pipe. Figure sewer from lot line.

Water Supply.—Pipes where exposed must be secured in place on ⅞-inch strips. Pipes must be so laid that they can be properly drained and shall be provided with check and waste cock at the foot of each separate riser and have extending handles boxed, and all detached plumbing shall have separate cock to shut off the cold water. Provide stop cock at curb, well protected with box and cover. Extend a ¾-inch lead pipe to inside of building, and from this point extend a ⅝-inch pipe, to be connected with all fixtures; all of extra strong lead pipe. Hot water supply to be of same size and quality and extended to all sinks, wash basins and bath tub.

Sewer.—Main sewer to be vitrified clay, 6 inches; conductor branches to be 4 inches, all put in in accordance with rules and regulations of the city.

Street Washer.—Place an iron street washer at side of building with ¾-inch galvanized wrought iron pipe and hose coupling connection, where directed; all complete with detachable handle faucet. Furnish and set in place ⅝-inch Worthington water meter.

Soil Pipes.—Soil pipes to be put in in accordance with rules and regulations of the city. Waste pipes to be 2 inches extra light lead pipe.

Ventilation.—Ventilating pipes to be put in in accordance with rules and regulations of the city.

Kitchen Sink.—Kitchen sink to be 20 x 30 inch white enameled cast iron, set on 20-inch wide brackets. Top and back of this sink to be lined with 20-inch high splasher full length of sink and drip board and to be of Pink Tennessee marble, notched to set on iron.

Laundry Tubs.—To be two-part Wesely, of soap stone.

Boiler.—To be 40-gallon extra heavy galvanized iron, tested to 200 pounds pressure to the square inch, set on ornamental iron stand, with shut off cock, sediment cocks and pipes, and to be connected to coil in range and heater respectively ready for use.

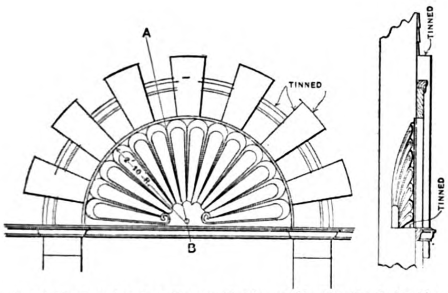
Bathtub.—To be white enameled iron, 5 feet long, with connected waste and overflow, guaranteed tub.

Wash Basin.—Wash basin to be D-218, Rundle & Spence catalogue, oval, with lead supply and P traps.

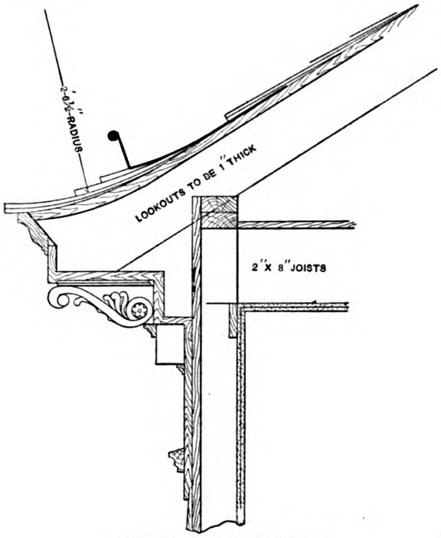
Water Closet.—Water closet in bathroom shall be best siphon jet closet, with Murphy flush valve and 40-gallon tank in attic. Basement closet to be white enameled cast iron with hard wood seat on legs, and have self closing valve, all complete.

Trimmings.—All trimmings to fixtures to be the best style of Fuller's patent work, brass for kitchen sink and nickel plate for the balance of the work. All plumbing to be best open work.

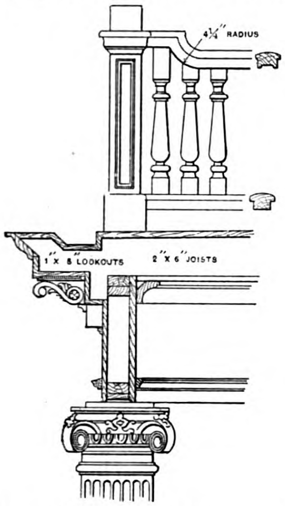
Gas Fitting.—The gas pipes to be laid in accordance with the rules and regulations of the city for all lights marked (*) on plans. Pipes to be so laid that any gathering of water in them can be drained off near the meter. Run separate pipes with shut off cocks, &c., for fuel gas to all



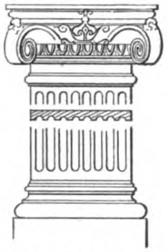
Detail of Cartouche for Front Gable, with Vertical Section on Line A B of the Elevation.—Scale, ½ Inch to the Foot.



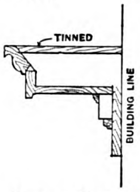
Detail of Main Cornice.—Scale, ¾ Inch to the Foot.



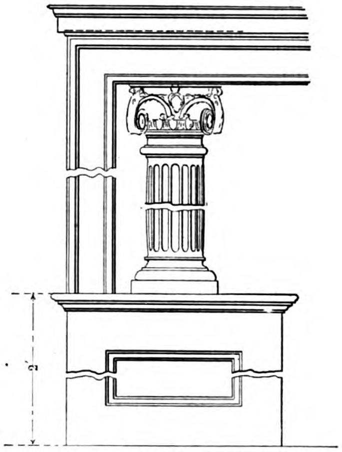
Section of Porch Cornice and Balustrade.—Scale, ½ Inch to the Foot.



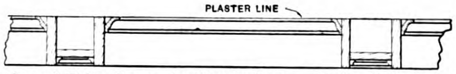
Detail of Corner Pilasters.—Scale, ½ Inch to the Foot.



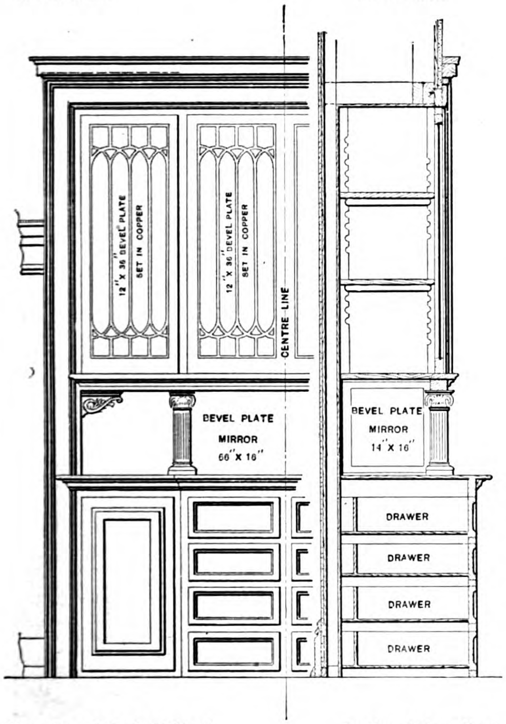
Dormer Cornice.—Scale, ¾ Inch to the Foot.



Finish of Cased Opening Between Sitting Room and Parlor.—Scale, ¾ Inch to the Foot.



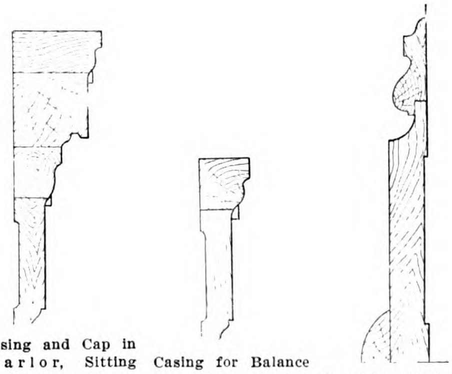
Section of False Beams in Dining Room.—Scale, ¾ Inch to the Foot.



Elevation of Left Half of China Closet.

Section Taken Near Center Line.

Scale, ½ Inch to the Foot.



Casing and Cap in Parlor, Sitting Room, Dining Room, Reception Hall and Vestibule.

Casing for Balance of Rooms Except Girls' Room and Closets.

Base for all Rooms Except Girls' Room and Closets.

Scale, 3 Inches to the Foot.

Competition in $6500 Houses.—First Prize Design.—Miscellaneous Constructive Details.

places marked fuel gas on plans. Estimate the sum of $150 for gas fixtures.

Electric Light Wiring.

The work must be done according to the rules and regulations of the Board of Fire Underwriters as now in force, and will be subject to inspection by the insurance inspector.

The system of wiring will be for the convertible two and three wire system for 110 volts pressure. The wiring will be done in the manner known as the insulator and bushing work; where the wire is passed through joists or from one floor to another they will be placed in porcelain tubes, otherwise they will be supported from porcelain insulators, not more than 4 feet apart. In places where it becomes necessary to run wires along brick walls they must be placed in circular loom or iron conduits. The distributing circuit will be taken from cut out cabinet. This will be made of wood and lined with sheet iron and set flush with plastered wall in second-story hall where directed, and will be finished off with casing and provided with a paneled door to match the surrounding wood work and to be placed 5 feet above the floor; door to be secured by good lock. In this cabinet will be placed the necessary cut outs; these may be either in tablet form, "Noark" type or of the Edison plug pattern. From the cut out cabinet feeders will lead to a suitable point in the attic, where they will terminate in a fused service switch and fuse from this point; leave the feeders hang outside of the building for future connection. In estimating the number of lights for the various rooms, the contractor will figure four lamps for each drop light and one for each wall light; all lights are indicated by (*) on plans. All switches to be flush switches, except in attic and basement, where snap switches may be used. Furnish and place push button at entrance door and connect to bell in kitchen.

Painter's Work.

The contractor for the painting and glazing must provide all necessary materials for the work, including paints, all oils, glass, putty and tools of every description to properly do the work of his department promptly as wanted. All materials of the several kinds must be of the best quality on the market and all work must be done in a skillful manner. Properly kill all knots with shellac and then paint all wood and metal work usually painted, both inside and outside of building, unless otherwise specified, four good coats. Body of house to be pure white, and cornices, casings and all other trimmings light canary yellow. Clean off before painting it all woodwork and putty and stop all cracks and defects. Sandpaper smoothly and properly prepare all work before applying succeeding coats. Attic room and basement to have two good coats of paint. All metal work and metal roofs will have the first coat of best mineral paint and the others of best lead and oil, as above specified. The entire roof to have two good coats of brown creosote shingle stain. All staff work to be dipped in boiled linseed oil before being set. Kitchen and bathroom to be painted, as above, and then to have two good coats of white enamel paint. Kitchen and pantry to be painted entirely white. All hardwood finish to be filled with Pratt & Lambert's stain filler, and then to have two coats of Pratt & Lambert's No. 38 varnish. Finish on first floor to be rubbed down with pumice stone and oil. All hardwood floors on first story, except kitchen, to be finished in this manner, but use linseed oil for base coat. Then apply two coats of shellac and then apply one coat of wax. Dining room finish to be stained to represent Flemish oak.

Glass and Glazing.

The glass of the building will be best Double AA Double-thick American, unless otherwise specified.

All glass set in sash, sash doors, transoms, &c., throughout the building to be well bedded, sprigged and back-puttied and left whole and clean on completion of the job.

Plate Glass.

Furnish and set in place plate glass mirrors in china closet and medicine case, as required by drawings. Also furnish and set mirror above seat under staircase and one in upper hall, where indicated. Sash doors to have chipped glass panels, unless otherwise shown or implied.

Detailed Estimate of Cost.

We present below the figures of cost, as furnished by the author, touching the various classes of the work:

EXCAVATING, MASON AND CEMENT WORK.

	Cost of material.	Cost of labor.
Excavating	....	$132.00
Footing stone	$65.00	8.00
Cement floor (material and labor)	....	67.50
Brick (common and face brick)	230.00	160.00
Flue lining	5.00	....
Colored mortar	7.00	....
Cement mortar, for plastering below grade	6.50	2.00
Totals	$313.50	$369.50

PLASTERING.

No. 1 hemlock lath and nails	$98.00	$50.00
Mortar (Imperial)	85.00	65.00
Finish for second coat	57.00	100.00
For tiling in kitchen and bathroom	....	22.50
Three plaster centers, 3 feet diameter	36.00	3.00
Stucco cornice	50.00	8.50
Totals	$326.00	$249.00

ESTIMATE OF CARPENTER WORK.

First-story joists	$39.96	$14.00
Second-story joists	39.96	14.00
Attic joists	30.00	11.20
Porch, balcony and rear deck joists	12.50	4.75
Exterior studs, plates, &c	52.83	19.60
Girders	6.20	1.50
Interior studs, first, second, attic and basement	61.00	22.50
Rafters	20.10	8.50
Bridging	6.07	5.00
Ribbon boards	4.00	7.50
Exterior sheathing	53.50	21.00
Floor sheathing	68.50	25.60
Roof boards	32.20	10.00
Building paper	29.51	11.40
Shingles	20.00	8.00
Furring strips	6.66	2.00
Outside Finish.		
Siding	$68.00	$21.00
Eight pilasters	78.00	20.65
Four pilasters	18.00	5.50
Main cornice	153.00	75.00
Dormer and bay window cornice	51.50	23.20
Balcony, deck and bay window railing	49.50	19.50
Rear deck railing	10.00	2.50
Porch railing	34.72	17.35
Front porch steps	10.00	4.00
Porch cornice	59.00	21.50
Twelve columns	107.50	5.50
Two half columns	12.00	1.00
Porch floor	17.20	3.50
Outside base	6.00	3.55
Window Frames. Including Frame, Sash, Outside and Inside Casing, Stool Finish, Stops, Weights, Cords and Pulleys.		
First Story.		
Two front bay double frames	$18.52	$6.00
Triple frame for side bay	15.10	4.50
Three window frames	25.16	6.20
Four window frames	23.00	5.50
One window frame	4.90	1.00
Second Story.		
Seven window frames	44.50	13.20
One Phœnix window	13.00	4.00
One window frame	5.00	1.00
One triple frame for front gable	38.10	10.50
Front entrance triple frame and door	20.00	5.00
Vestibule inside frames	11.50	4.20
Basement Frames.		
Four double frames	8.20	2.75
One frame	1.48	1.00
One frame	1.38	1.00
One frame	1.20	.90
One frame	1.30	1.00
Dormer Frames.		
Two frames	8.40	4.56
One frame	5.40	2.50
Interior Finish.		
Main staircase	$70.00	$30.00
Attic stairs	22.00	10.50
Cellar stairs	20.50	10.50
China closet	56.00	20.00
Clothes chute	8.00	2.50
Medicine case	5.00	1.20
Finish in pantry	18.50	11.25
Cased opening between parlor and sitting room	23.00	5.20
Beamed ceiling in dining room	47.00	19.50
Paneled wainscoting in dining room	47.20	16.50
Picture molding	6.20	2.50
Closet shelves	3.20	1.50
Strips for clothes hooks	6.00	2.00
Closet drawers	5.50	2.20
Three window seats	17.00	5.50
Three-member base	31.50	9.50
Closet and attic base	6.00	2.50
Floors.		
Attic and basement floors	$64.00	$14.00
Dining room	14.75	3.00
Floor for balance of first story	40.90	15.50
Floors for entire second story	56.50	21.25
Doors for First Story. Including Doors, Hardware Trimmings, Jambs, Stops and Casings.		
Two sliding doors	$40.00	$8.00
Ten doors	88.50	23.00
Second-Story Doors.		
Eleven doors and two cased openings	104.50	25.20
Attic and basement doors	50.50	14.20
Nails, including sliding door hangers, &c	35.00	....
Hardware	70.00	20.50
Mantel	50.00	5.00
Total carpenter bill	$2,410.80	$787.61

TIN AND GALVANIZED IRON WORK.

Galvanized iron for gutters	$19.20	$12.05
Galvanized iron for ridging	7.00	17.00
Galvanized iron for conductor pipe	4.60	6.44
Tin and solder for decks	30.00	12.00
Tin for valleys and dormers	3.25	2.75
Tin for flashing chimney	.75	.75
Tin for returns and arched windows	1.75	4.25
Tin for window caps	3.00	1.00
Tin shingles	2.40	...
Totals	$71.95	$56.24

ELECTRICAL WORK.

1,200 feet No. 14 R. C. wire	$14.00	....
125 feet No. 10 R. C. wire	5.00	....
400 tubes, 3 x 5-16 inches	2.30	....
300 No. 5½ knobs	2.10	....
250 feet circular loom	15.00	....

2 3-wire double hand cut out	1.60	....
12 flushed switches	9.60	....
4 3-way flush switches	3.60	....
1 main line cut out	.60	....
1 main switch	1.25	....
1 pound tape	.40	....
100 feet No. 18 wire	.30	....
1 battery	.35	...
1 bell	.37	....
1 push button	.60	....
Total cost of labor	....	$19.50
Totals	$57.07	$19.50
HEATING.		
One "A" 540 boiler, 975 feet capacity	$109.00	....
Radiation	154.00	....
Pipe and fittings	73.00	....
Bronze	12.00	....
Total for labor	....	$81.00
PLUMBING.		
Sewerage	$83.50	....
Gas pipe and labor	39.00	....
Meter	11.00	....
Bathtub, basin, closet, sink, basement closet and laundry tubs	127.00	....
Ventilation, waste and supply pipes	134.50	....
Total for labor and plumber's time	....	$71.50
Gas fixtures	150.00	4.50
Total plumbing and heating bills	$893.00	$157.00
PAINTING.		
Exterior painting	$80.00	$95.00
Shingle stain for roof	55.00	20.00
Interior painting	81.00	121.00
Glass (plate and double A, American)	129.00	....
Art glass, $2 per foot	76.00	....
Labor for setting glass	....	19.50
Totals	$421.00	$255.50

RECAPITULATION.

Excavating, mason and cement work	$683.00
Plastering	575.00
Carpenter work	3,198.41
Tin and galvanized iron work	128.19
Electrical work	76.57
Painting and glazing	676.50
Plumbing, heating and gas fitting	1,050.00
Grand total	$6,387.67

A valuable feature of the above estimate to which attention should be called is the shape in which the cost of labor is presented.

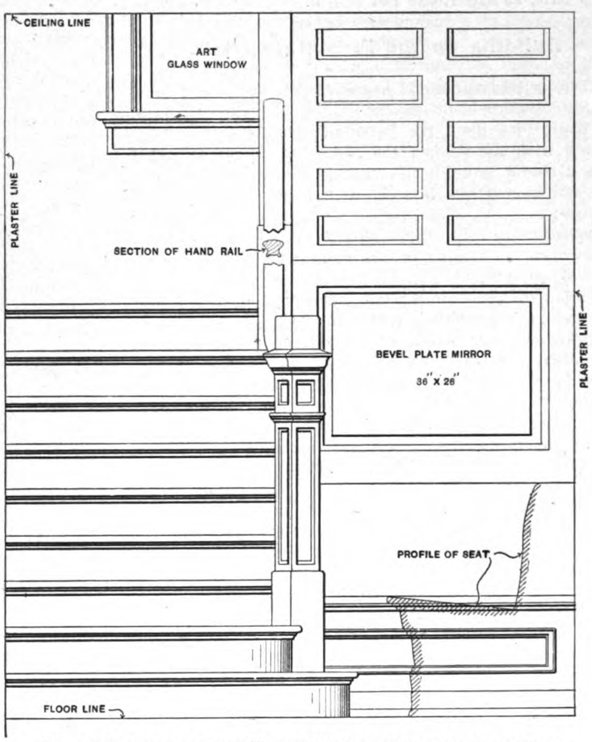
The certificate for the mason work was signed by Louis Schoknecht, 186 Burleigh street; that for the plastering work by Herm. Kath & Sons, 1063 First street; that for the carpenter work by F. O. Johnson, 729 Thirty-fourth street; that for the tin and galvanized iron work by Held & Dern, 1524 Fond du Lac avenue; that for the electrical work by E. G. Muenzberg, 682 Thirty-first street; that for the plumbing and heating by Lehan & McNally, 415 Jackson street, and that for the painting work by Herm Brothers, 500 Thirtieth street, all of Milwaukee, Wis.

◆

Making Brick Walls Damp Proof.

Modern damp-resisting paints have proved their economy over old-time furring, both as to space saved and general efficiency of results. The proper execution of the work is the vital point, and when this is neglected there is a waste of otherwise good materials and impairment of the plastering and decoration. This is overlooked too often and sad results ensue. There is a great economy in the use of these paints which warrants at least a fair outlay of labor to secure their proper application.

Vertical Section of Paneled Wainscoting in Dining Room.—Scale, ¾ Inch to the Foot.



View of Staircase Looking Toward the Rear of the House.—Scale, ½ Inch to the Foot.

Competition in $6500 Houses.—First Prize Design.—*Miscellaneous Constructive Details.*

In a brick wall improperly built, containing deep crevices and pockets having openings to both the weather and the interior, it is useless to expect any material to resist the penetration and consequent pressure of the water, says a writer in the *Engineering Record*. This is often the condition with common work. The damp-proofing is a damp resistant and cannot assume the role of an obstruction against pressure; hence the absolute necessity that all joints, at least those on the exterior and interior sides of a wall, be absolutely full. Only too often does it occur that the cross joints are free from mortar when, on account of rush work, the bricklayer wipes his trowel on the end of the brick and it goes in, whether the mortar drops off or adheres. Opponents of damp-resisting paint have maintained that this makes little difference when an outside wall is furred, but experience shows that moisture and even leaks find ready ingress into walls of

such construction and bring dampness within, although it may not be visible, and must in time produce ill effects, on account of its absorption by the furring.

Having said this much for the construction of the exterior walls, the application of the damp resisting paint must be considered. This work should be done by a painter who is a good brush hand. The paint must be well brushed on, and all holes and cavities which do not fill up or become positively covered by the paint must be stopped with putty or mortar and retouched. Special care must be given to the surface before the application of the paint; lumps of mortar should be cut off and the surface gone over with wire brushes, particularly in the angles at the floor and ceilings. This must also be done between the beams in the beam-filled construction, where steel wall beams or channels do not intercept, and at the reveals of all openings, doors, windows and the like. The purpose is to have the damp-resisting paint form a solid continuous film which when secured will positively check all moisture drawn by capillary attraction. Plastering and decorating on a surface painted in this way is perfectly safe, as experience has shown.

Building on the Percentage Basis.

More or less discussion has ensued in the past regarding the advantages or disadvantages of conducting building operations upon the percentage basis, and in connection with the subject the following comments, taken from a recent issue of the Philadelphia *North American* may not be without interest to a large number of our readers:

Investors in real estate, architects and many building contractors are coming to realize that the most economical and satisfactory method of erecting buildings of any size is on the percentage basis instead of on the basis of a lump-sum bid—that is, the builder engages to erect the building or make whatever alterations are desired for the actual cost of the work plus a percentage as compensation for himself. Several of the large office buildings in Philadelphia have been built on this plan, and the indications are that it will not be long till it completely supersedes the old method of lump-sum bidding.

There are many advantages both to the owner and builder in this method of building. Though the owner may not know exactly what the building is going to cost him the expenditure of his money is always within his own control and easy of verification at any time. He receives from the builder an itemized account of the cost of material, labor, &c., and he is relieved of the danger of "extras." The work can be carried on so as to best suit his own interests, rather than those of the contractors, and any changes which may suggest themselves during the course of erection can be made without unnecessary expense.

Contractors, on the other hand, are always assured of a decent profit on their work. They are not harassed by unexpected rises in the price of material or by penalties for delay occasioned by strikes or other causes often totally beyond their control.

In other words, the element of risk inseparable from the lump-sum basis of work is practically eliminated, and a builder is free from all temptation to "skimp" certain parts of the work to compensate him for unlooked-for inroads into his profits encountered in other parts of the work. With him all contracts are on the same basis, all can be treated impartially and the best interests of every contract can be served. This is particularly the case where the contractor makes a specialty of work on the percentage basis and declines all lump-sum contracts. The advantages to the builder of working on the percentage basis are indeed so many that many of the large builders, both here and in other cities, prefer operations of this character, though they are not prepared to refuse to work on the lump-sum basis if the owner so desires it, as is often the case.

It is necessary, however, that the builder should use the proper speed in construction, otherwise the building may cost the owner much more in the end than he could have had it erected for a lump-sum bid.

Many builders, however, complain that investors do not, as a general rule, look with favor on the percentage system of work. They desire to be relieved of all risks, evidently taking the view that the risks properly belong to the contractor, and for this reason they prefer to accept a lump-sum bid, which may seem to them to be high, rather than assume risks which their knowledge or experience cannot help them to avoid.

The spectacle of contractors being forced into bankruptcy through contracts from which they had hoped to realize large profits, which occasionally presents itself, is not, it is true, calculated to reasure investors in real estate as to the wisdom of assuming most of the risks of building; yet failures of this kind occur so rarely as to have very little effect on the growing sentiment in favor of cost plus a fixed charge for all kinds of building work.

Palatial Horse Repository.

Ground is to be broken in the immediate future for a large six-story fireproof building, running through the block from Sixty-first to Sixty-second street, near Broadway, New York City, which will be used for the sale of fashionable carriage horses and for the storage of vehicles when occasion demands. The exterior of the building is to be of gray stone, copper and glass, handsomely ornamented and finished in the French Renaissance style of architecture. According to the plans, which have been completed by architects Hill & Stout, the greater portion of the ground floor will be reserved as a show stable and for about 50 stalls for show horses. There will be altogether stalls for 600 horses on the different floors, with a portion of the fourth reserved for the hospital. Coachmen and grooms will have quarters on the fifth floor, where there will be a large reading room and billiard room, individual lockers, lavatories, &c.

A novel feature of the new building will be a roof garden, riding ring and sales ring 45 feet high and inclosed with glass. Here there will be an uninterrupted expanse of tan bark on the floor, giving the largest and lightest ring in the city for equestrian exercise in disagreeable weather when the bridal paths of Central Park are not available. The new building is to be erected for the recently organized Tichenor-Grand Company, and the contract for the work has been awarded to the Thompson-Starrett Company of the city named.

Remodeling the Old Astor House.

The historic old Astor House on Broadway, extending from Barclay to Vesey streets, New York City, is to undergo some important alterations which involve a rather difficult engineering problem. Large granite piers now obstruct the front of the ground floor stores and the problem is to remove these without disturbing the upper floors and shoring up the building and supporting over 400 tons of granite masonry on a 32-foot span, the object being to provide increased store facilities at the ground level. The work will necessitate the entire front of the building being temporarily supported until a 30-inch steel girder can be run in to form the permanent resting place of what is now supported by the piers. The problem has been worked out by Architect William E. Lehman of Newark, N. J., and it is expected to have the work completed by April 1.

In this connection it may be interesting to remark that the old hostelry was built in 1830 in what was then the heart of New York City. It belongs to the Astors, whose practice it has been never to part with a piece of real estate, and up to the present time the old six-story hotel, built entirely of squared granite masonry, has never been altered so far as the removal of any walls was concerned.

◆

THE TRADE SCHOOL IDEA has advanced to such an extent in England that the Manchester School of Technology has equipped a department for those who wish to engage in matching teas, testing butter, &c. According to a recent report there were 246 students attending classes at Manchester for instruction in the technical part of the grocery business. Some 75 per cent. of this number attended a maximum of 20 lectures and 80 per cent. of those entering for examination satisfied the examiner.

PROBLEM IN GEOMETRICAL STAIRWAY CONSTRUCTION.

By Morris Williams.

In what follows I shall endeavor to show how to construct a wreath in one and in two sections over and above a quadrant of 13½-inch radius containing six risers. It sometimes happens that the right dimension of lumber is not available to construct in one section such a wreath as that mentioned and in such an emergency it must be made in two sections. As a knowledge of the proper method of managing under such conditions may be appreciated by the readers of *Carpentry and Building* I purpose showing how to lay out the lines for the wreath in one and also in two sections. The plan, Fig. 1, represents a design prepared by an architect who obviously did not consider, as he should have done, the necessity of arranging the risers in and around one cylinder so as to obtain the best results for the finished rail. With such a plan as this it is an impossibility for any one to make a presentable job on the rail, in that it is assumed to follow or nearly so the nosing line of the steps.

In this plan we find two straight steps 10½ inches wide from the starting newel to the springing of a quadrant, 13½-inch radius, into which is crowded six winders, then a level landing 22 inches in width, which connects with another quadrant containing the same number of winders, which adjoins a few straight steps leading to the newel on the second floor. The falling line of a rail for such an arrangement will be a zigzag line of varying pitches all along from newel to newel, which will cause the finished rail to present a most unsightly appearance. Another very undesirable result of such a plan will be the continual change in the stepping facilities. Apart from the few straight steps connecting the newels we find 12 narrow winders, each of about 4 inches in width, and a 22-inch platform, which will demand the greatest vigilance in ascending and descending to obviate a false step. What makes the construction still more undesirable is the fact of its being located in a public building where ungovernable crowds are factors, which should be taken into consideration.

A plan of stairs which would obviate all the undesirable features present in the one under consideration suggests itself in the dotted semicircle from a to a of Fig. 1. By distributing the risers at an equal distance all along a semicircular line, as from a to a, we would have a straight falling line, equal winders and a graceful curve for the finished rail, thus securing safety and beauty, which are factors not to be overlooked in stairways located in a public building. In addition to these advantages we may mention also a great saving of labor in the manipulation of the wreaths, because in this instance we would have only two pieces—one from a to d and the other from d to a, both of the simplest kind—that is, wreaths of equal inclined tangents requiring only one bevel for the four joints—namely, the two ends of both wreaths applied for the purpose of their squaring or twisting.

The stairs having been constructed according to the plan shown in Fig. 1 left no alternative but to go ahead and lay out the wreaths to stand over and above the two quadrants. In Fig. 2 is shown how this was done over the first quadrant, which we will designate as No. 1. The first process is to lay out the elevation and pitch lines of the tangents. From d on X Y measure the hight of six risers to the point 4, as shown. From 4 draw a level line to represent the platform floor above this line. Draw another parallel to it at a distance, say, of 6 inches, more or less, to represent the central line of the platform rail. In the plan draw the diagonal line, as shown from O, and tangent to the central curve of the plan rail draw the lines b and c. The plan as it now appears indicates four tangents—namely, a, b, c and d, two for each piece of wreath. These we will now transfer to X Y, as shown at a', b', c', the tangent d' being already in position.

Place the pitch board at a' and draw the pitch of the two straight steps, shown in Fig. 1, from the newel to the quadrant. Now from 4, the highest point in the elevation, we draw a straight line to m to represent the pitch line of the four tangents. At m, where this line intersects with the pitch line of the two straight steps, is formed a graceful ramp, so as to align with the pitch line of the tangents, as shown. Another ramp from 4 will have to be formed to connect the platform landing rail with the pitch of the tangents. The joints are fixed as shown at 4, 1 and S.

By placing one leg of the compasses in Z and extending the other to touch the pitch lines of the tangents and turning over, as shown, to w we find the hight of a triangle, which by having for its base the radius O d of the central plan of rail will constitute the only bevel required for the two wreaths, which in all cases where tangents are equally inclined is to be applied to each end, and in this case for the two sections. It will be observed that this diagram as it now appears is in a fairly good state to afford an idea of the changes in inclination the rail will assume from the first newel to the platform, and, as previously stated, the abrupt angles at each springing here shown would be eliminated by following the suggested plan of a semicircular central line of the plan rail, shown from a to a in Fig. 1.

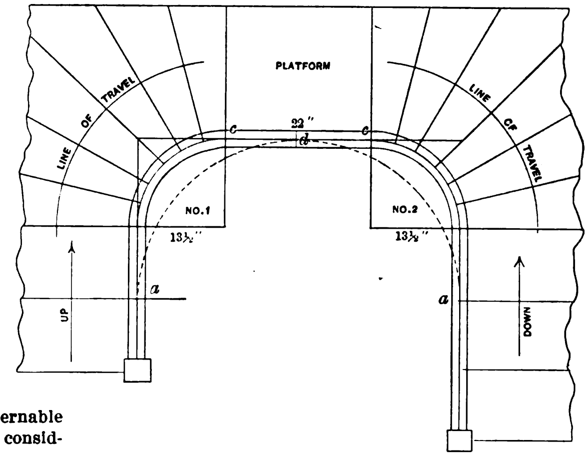


Fig. 1.—Plan of Stairs.

Problem in Geometrical Stairway Construction.

In Fig. 3 is shown the simplest method in practice of drawing the face mold. Let 1 2 3 4 in this diagram equal 1 2 3 4 of Fig. 2. It will be observed that 1 3 in Fig. 2 stands for the bottom tangent of the upper section of the wreath and 3 4 for the top tangent. The same numbers represent the tangents therefore in Fig. 3. All we have to do now is to find the angle required on the face mold between the two. Referring to the diagram, from 2 erect a perpendicular line indefinitely. Place one leg of the dividers at 3 and extend the other to 1; turn over to cut the line drawn from 2 in 5 and connect this point with 3, which will be the bottom tangent, as it is required on the face mold as a directing line to square the joint at the end 5. The upper tangent 3 4 is already in its correct position in relation to the bottom one and the joint at 4 therefore will be made square to 3 4.

From 1 draw a line to 5 and from 3 draw a line par-

allel to it, making 3 6 equal 3 6 shown in the plan, Fig. 2, and draw the circle with a radius equal to half the width of the straight rail. The circumference of this circle indicates the width of the face mold at this point, it being what is known as the minor axis.

The width at the ends 4 and 5 is taken from the bevel in Fig. 2 and the curves are drawn by bending a lath to touch the points thus found for both the inside and outside curve. It will be observed that this mold will satisfy the conditions for the bottom wreath also, in that we have in both sections similar plan lines and pitch lines to the developed tangents.

We will now turn our attention to quadrant No. 2, shown in Fig. 1 to be at the junction of the platform and the upper flight landing to the second story. In Fig. 4 is shown the plan development and pitch of the tangents. In this case it will be observed that the wreath will be in one piece from springing to springing. Draw a line as shown to represent the floor line of the platform. From c'' erect the line c'' 5′ equal in hight to the combined depth of the seven risers shown in the quadrant. Draw the line X Y, as shown. Draw the pitch line of tangents from 5′ to 2. Above the platform floor draw the platform rail to correspond to the hight shown from the platform floor to the center of the platform rail in Fig. 2; also draw the ramp as shown to align with the pitch line of the tangents. This ramp is to be a duplicate of that shown from 4 to the center of the platform rail in Fig. 2.

From b'' on X Y draw the line b'' 3 square to the pitch of the tangents. By revolving the point 3, as shown, to Z we will find the only bevel required, but which, as previously stated, owing to the tangents being equally inclined, will have to be applied to each end of the wreath.

We are now prepared to draw the face mold, which, as shown in Fig. 5, may be accomplished with but very few lines. First, a straight line is drawn and upon it is transferred the points 1 2 3 4 5 from the pitch line of tangents in Fig. 4. From 3 draw a perpendicular line indefinitely. Place one leg of the compasses in 4; extend the other to 2; turn over to cut the line drawn from 3 in 6 and connect 6 with 4. The lines 6 4 and 4 5 as here presented will be the tangents on the face mold, the joint at 5 will be made square to the tangent 4 5, and at 6 to the tangent 6 4. A short straight piece is added to the end 6, as shown from 6 to 7, corresponding in length to 1 2, shown in Fig. 4.

To draw the curves first find a point on the minor axis as at *d*, which in this case is found by making 4 *d* equal to *b d* on the plan in Fig. 4. The circle around *d* represents the width of the straight rail. The radius of the semicircle at 5 equals *X X*, shown on the bevel in Fig. 4, which determines the width of the mold at this end and also at 6, owing to the fact that both tangents are equally inclined. Now draw the inside and outside curves by bending a lath to touch the circumference of the circle and semicircles, as shown.

In Fig. 4 at *d* is shown a joint between two ramps above the platform floor which connects the two quadrants, as shown in the plan, Fig. 1. The dotted ramp belongs to the bottom flight and quadrant and is shown in Fig. 2 from 4 to *d*. We place it here to show its relation with the other ramp, as both ramps must meet at the distance *d* from the platform. The tangents of the bottom quadrant are shown, both in this and in Fig 2, to intersect the central line of the platform rail at *c*, and the tangents of the upper quadrant also are shown to intersect at *c* of the central line of the platform rail. Thus, point *d* on the same line is shown to stand relatively to both quadrants at the same distance from the platform floor.

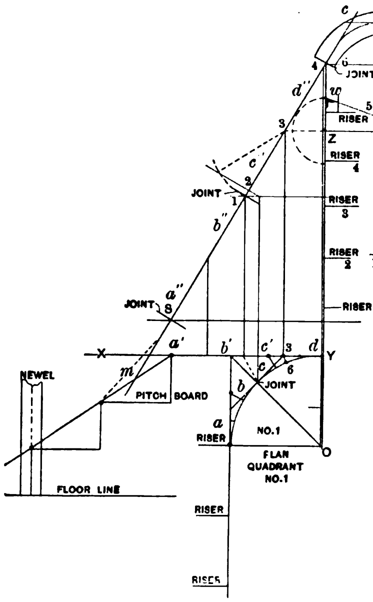


Fig. 2.—Laying Out Wreath to Stand Over **First Quadrant.**

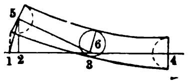


Fig. 3.—Drawing the Face Mold.

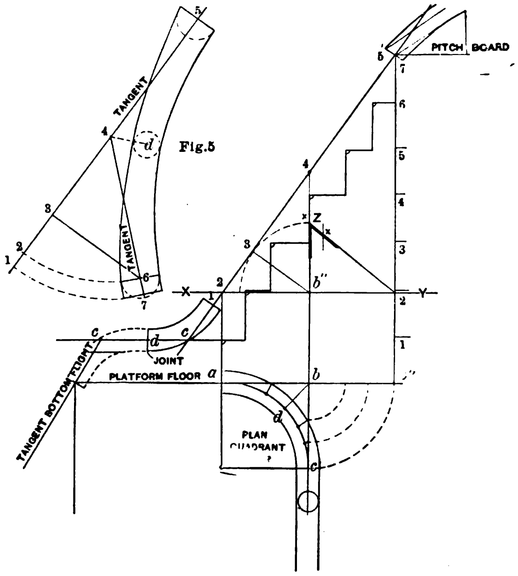


Fig. 4.—Plan Development and Pitch of Tangents.
Fig. 5.—The Face Mold.

Problem in Geometrical Stairway Construction.

Building Under Difficulties.

An interesting mode of conducting winter building operations may be seen at 607 First avenue, Northeast, Minneapolis, Minn., where, says a local paper, the excavation is being made for a large five-story building for the Whitcomb-Noble Company.

An area in excess of that to be covered by the factory was inclosed in a temporary shed last week. Then for three days the temperature within the shed was kept at more than tropic heat by the burning of soft coal in salamanders. At the end of this time the ground had softened sufficiently to make digging with a pick and shovel an easy matter. The fires, however, are still maintained and within the wooden inclosure 30 men with sleeves rolled up load the dirt, and although two wide doorways are left open for the dozen teams that are coming and going they feel no more relief from the outside cold than one might feel from the North Pole on a July day.

FANCY ARTICLES FOR PYROGRAVURE TREATMENT.

BY C. TOBYANSEN.

THE demand for turned objects adapted to pyrogravure decoration is a welcome and pleasing feature as contrasted with the ordinary run of shop work, giving the turner and scroll sawyer a wide scope for his inventive and artistic ability, as well as for his ingenuity. The objects are of the greatest variety and as often as not the turner is left to his own fancy as to the proper shape for the article in demand. As a rule the object, whether it be a vase, urn, box or other receptacle, should be turned rather plain, seeking elegance of outline mainly and leaving off all beads or rings which tend to break up the surfaces to be decorated. The surfaces, however, may be divided in such a manner as to give full play to ornamental curves and lines.

The urns and vases suggested in the accompanying sketches are of such simple outlines as will commend themselves to the amateur artist who wishes to do his own decorative designing. There is nothing original in these shapes, for they come from as far back as the ages of the ancients. They are such as are found in excavations for antiquities and belong to ages of which history tells not. The potter's wheel, the forerunner of the turning lathe, was probably the first machine ever invented by human skill and on this the wieldy clay was formed into the simple yet elegant utensils admired to-day in our museums and collections. So we see the turner's art is of an ancient but honored lineage and if the turner or amateur artist finds himself lacking in inspiration as to shapes or decorative designs hark ye to the museum and study old ceramic art.

The forms given in Figs. 1, 2 and 5, however, may be called fundamental shapes, and these may be enlarged or diminished, contracted or expanded, in their relative parts, and they will adjust themselves to any form of decorative treatment and fancy. When we are forming these articles in the lathe it is an easy matter to run around the object a number of light pencil lines, which will serve to guide the designer and be found of great assistance in keeping within proper confines ornaments such as are suggested in Fig. 1 of the illustrations.

The most serviceable material for these articles is bass wood, which is soft and white. It is a favorite wood of the pyrogravure artist, but white wood, more commonly available throughout the shops, will also serve very well. It is nearly as soft as bass wood, but it is apt to darken with age, thus diminishing the distinctiveness of the design. It is this quality which makes it so much inferior to bass wood for wood burning when the material remains otherwise unstained. It must be remembered that of late stains play a prominent part in this art and white wood takes stains equally as well if not better than bass wood. Common water color serves admirably and the results if tastefully used are excellent. There is no other way of decorating wood so easy of accomplishment as that of pyrogravure. It requires no special skill such as wood carving or interlaying demands, and any amateur can obtain satisfactory results after a very little experience. Some decision, however, is required, for when once you start to make a line you must make it. Do not stop the pencil or point in the middle; that means a burnt spot. Make up your mind what you mean to do before touching the tool to the wood work with freedom but steady strokes, and do not attempt very close shading, and of course do not forget to blow. The compression and relaxation of the bulb become a habit after a while—automatic—and require no attention. You will then be at liberty to keep your mind fully on the drawing. Flat surfaces, such as the picture frames in Figs. 9 and 10, are easier to draw on or decorate than the round article, but after all it is simply a question of a little practice, and this practice is patience well rewarded, as the results will be most pleasing.


Fig. 1.—Turned Vase with Sawed Feet.


Fig. 2.—A Turned Vase.

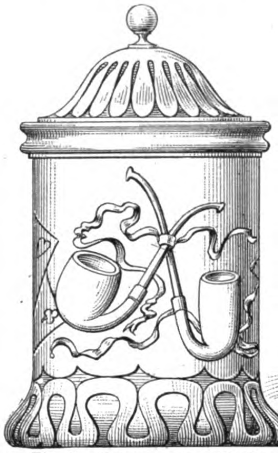


Fig. 3.—Tobacco Box with Cover.

Fancy Articles for Pyrogravure Treatment.

It is far preferable to create your own designs—give the article the stamp of your own individuality. It is not difficult at all. It need not be very elaborate; a few simple, pleasing lines of your own originality will give more satisfaction than an intricate design that is copied. But whether the design be of your own invention or a copy utmost care should be practiced to keep the lines, more especially the curves, even and graceful of form. There is a harmony in lines as there is in music—not passing, but lasting. The one appeals to our vision as the other to our hearing, and the higher the cultivation the quicker our senses respond to the appeal and the keener the appreciation. As a concourse of sweet sounds is disturbed by one discordant note, so is an entire design easily spoiled by a single broken backed curve. But the note passes on the instant, while the despoiled curve stands a silent rebuke against its perpetrator.

Ornamental designing is generally divided into three classes—naturalistic, conventional and geometrical. The first class, broadly speaking, is pictures from nature—sky, sea and land—bits of scenery realistically carried out. The second class, and this is the kind mostly used in pyrogravure, is the kind suggested by natural objects, but the details are omitted and their forms construed to fit fancy or space. Straight stems become interlacing curves, while leaves conform themselves to the flow of these stems; dragons and other animal shapes take fanciful forms—the designer becomes a creator and the most angular forms of nature turn into lines of grace and

beauty, limited only by the ability or inspiration of the artist.

The last class, as the name plainly indicates, consists of geometrical forms—straight line patterns, whole or semicircles, repeated and combined, much used in borders or beltings. These also are much used in wood burning subservient to the main design or framing. It is this form of ornamentation to which the remark about pencil lines applies, while the stuff is still in the lathe, as they define the boundaries of the borders or belts around the work.

These briefly are the different classes of ornamental designs which the artist or amateur has to apply, and it depends on his own taste what to choose in order to properly fit the object of decoration. The practical execution of these objects presents in itself no special difficulties which have not before been touched upon in the articles on wood burning, but we will briefly consider the main points.

An urn like that shown in Fig. 1 will require a chunk of wood 1 inch longer than the hight of the finished object and slightly larger in diameter. It may be fastened on a center screw plate or fitted in a chuck. In the latter case it should be roughed out between centers of the lathe and the surplus inch on the end may be turned down to fit any chuck which the operator may have on hand. Make a snug fit so it will fasten firmly. It is quite a strain to remove a lot of end grain wood, as will be necessary to hollow it out, and unless very firmly fastened it is apt to become off center and thereby spoiled, as it is scarcely possible to hammer it fast in the chuck again into its former position without breaking after once the hollowing out operation has commenced. If it is fastened on a face plate the center screw must be a fairly stout one. It is well in this case also to rough out between centers first to an approximate shape of the finished object and trim the extreme end toward the tail stock true and slightly hollow, so it may rest truly and square on the face plate. If it is not desired to rough it out at first, as already directed, then at least chop off the corners and saw squarely off the end to go against the screw plate, so that it will be neither hollow nor rounding, else it will wabble on the plate, causing no end of annoyance in the process of turning. Again, bore a hole slightly smaller than the screw before fastening, else we are apt to twist the screw off, leaving part of it stuck fast in the end of one block, a happening which may bring forth strenuous expressions. Shape the exterior out first, down as far as the depth you wish the interior opening to extend, but not much further. If it is reduced at once to the small size down at the foot the material is apt to shatter when you come to turn out the interior. It would not be advisable to make this operation first, as we might easily remove too much wood and consequently not be able to get the desired exterior profile. It will expedite the work greatly to bore an inch hole or thereabouts into the block before commencing to turn out the interior, as it gives a starting point for the tool and we can cut partly sideways instead of directly against the grain; also it will gauge the depth for boring in the proper length.

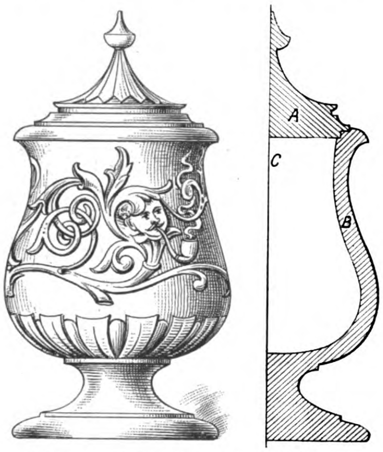


Fig. 4.—Another Tobacco Box with Cover.

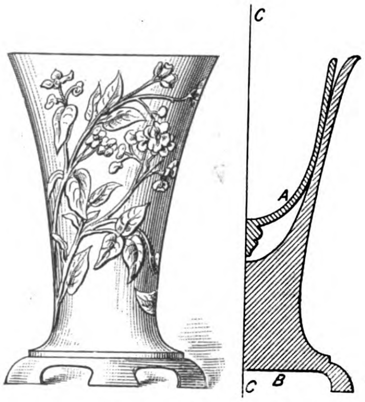


Fig. 5.—General View and Half Section of Turned Vase.

Fancy Articles for Pyrogravure Treatment.

When the interior form is such as shown in Fig. 4 (see half section) a special form of scraping tool will be needed to do the work. Such a scraper cuts the best when ground on one side only and left flat on top.

Referring again to Fig. 1, after the interior is dug out there remains the finishing of the exterior at the foot and sandpapering inside and out; draw pencil lines around for the belting and lower border and cut off to the right length to which it is to be finished. Now reverse the material in the lathe and hollow out the part which forms the feet. We shall need a chuck large and deep enough to inclose the largest diameter of the urn. If such a chuck is not at hand make one by fastening a suitable block of wood on the center screw plate and hollow it out as needed. The lugs finally may be sawed out on a scroll band saw. If this is not at hand a small fret saw will do nicely, or if this is not available a jackknife will do the work if great care be exercised.

Figs. 3, 4 and 6 have covers, as will be observed at A of Fig. 4 in section. Care should be taken that these fit snugly and they may be turned in two operations, fitting the bottom side first by cutting a little wood away at a time and testing frequently. This being done, reverse on the face plate and finish.

Fig. 5 is designed to hold flowers in water. Any broken goblet or glass may be inserted as suggested in the half section of this sketch at A, the interior being turned to fit whatever vessel one may have conveniently at hand. By broken goblet we mean of course that the stem or foot part may be broken off. At B in this section is shown the hollow part for the feet, the same as in Fig. 1.

The beer stein shown in Fig. 6 has its cover hinged onto the handle. These parts are sawed out on a jig or fret saw, which, by the way, may be an attachment to the lathe, a description of which we shall endeavor to give in a subsequent article. After these parts are filed up smoothly in the cuts and sandpapered they can be glued on the stein, taking care to fit them nicely at the joints. The little turned legs may have a small pin or tenon to fit a hole bored for them, or they may be just round balls with a hole drilled through them and fastened with small brads. This article makes a very handsome ornament. The candlestick may be turned out of one piece, but the edges at the base are then very brittle and easily broken off because of end grain. It is therefore advisable to turn in two pieces and tenon together. The jewel, button or glove box, whatever we may wish to keep in it, can be made any size or hight, and when completed is a useful and acceptable present. In Figs. 9 and 10 are shown two

small picture frames formed on the jig saw, except the center hole in Fig. 9, which is turned out. The little head cut from B to C is first formed, after which the article is reversed on the lathe and rabbeted out as at A. These frames also make a neat and useful ornament and may be made in endless variety of design and shape.

The clock or statuary bracket shown in Fig. 11 may be half or three-quarter round, according to shelf space needed. It is fitted with a thin, flat back piece, A, which has a hole through it at B for convenience in hanging. It should be glued on the full length of the bracket and shaped to closely fit the outline.


Fig. 6.—Beer Stein with Cover.

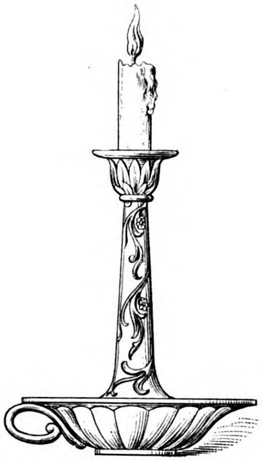


Fig. 7.—Turned Candlestick.


Fig. 8.—Jewel Box with Cover and Sawed Feet

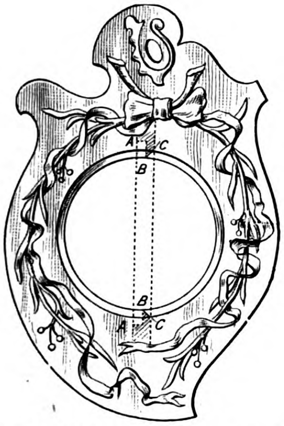


Fig. 9.—Picture Frame to Hang on Wall. —Center Turned Out.

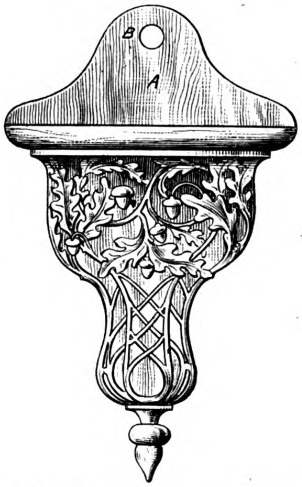


Fig. 11.—Turned Clock Bracket.

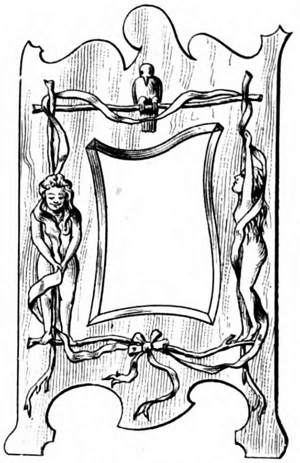


Fig. 10.—Sawed Picture Frame with Easel Back.

Fancy Articles for Pyrogravure Treatment.

Wells, Fargo & Co. Building at Portland.

The new 12-story building which is going up at the corner of Sixth and Oak streets, Portland, Ore., for Wells, Fargo & Co. will be the largest and most substantial structure in the city. The foundation consists of a reinforced concrete waterproofed box, the side walls of which are built of concrete to act as retaining walls. The basement floor is a reinforced concrete slab with a cement finish to withstand possible upward pressure resulting from flood conditions when the river is high. All columns will be fireproofed, with brick in the cellar and with terra cotta on the floors above. Hung ceilings are contemplated, with 5-inch fireproof filling around and above beams. The interior walls on the street façades will be of cut stone or of terra cotta, with brick backing to the top of the second story. The third story is to have terra cotta finish, above which to the heads of the tenth-story windows will be brick walls, the windows have brick mullions and arches, with terra cotta sills. The two top stories will be of highly ornamental terra cotta, backed with brick, the window frames of these two stories to be of ornamental cast steel. The side walls on rear lot lines are to be of brick, with terra cotta trimmings. All terra cotta will be glazed with watt finish. The roof covering is to be terra cotta tile, and the skylights are to have metal frames, with wire glass filling. The building is to be steam heated. There will be three high-speed electric passenger elevators.

◆

A short time ago we referred in these columns to the model tenement houses which were to be erected through the munificence of Henry Phipps, who subscribed something like $1,000,000 for the purpose, and pointed out that the buildings were to consist of three groups, of which two are already under consideration on the north side of Thirty-first street east of Second avenue, in this city, and in West Sixty-third and Sixty-fourth streets. The third group, which is about being started, will be situated at the southwest corner of Ninth avenue and Twentieth street, fronting 100 feet on the avenue and 250 feet on the street.

SOME COMMENT ON WOOD FILLERS.

IT it well known in the trade that wood fillers are divided into two classes—paste and liquid; but their uses, more especially in connection with hardwood finishing, are not fully understood by every mechanic, and suggestions are therefore always in order. In a series of articles by George Whiglet recently running in the *Painters' Magazine* there is presented some valuable information relative to the subject of paste and liquid fillers, with suggestions touching their use which cannot fail to command the attention of all those having to do with the finishing of hard or other kinds of wood for that matter. In discussing the subject the author says:

Paste fillers must be thinned down to the consistency of flowing varnish. As a thinner you may use turpentine or benzine, but the turpentine is much to be preferred, for the reason that it is low volatile, or evaporates slower, and is therefore low inflammable and dangerous. Turpentine holds its moisture for a considerably longer period than benzine and thereby allows the finisher a better chance to apply the filler on a larger surface and to rub it into the pores more properly than filler thinned with benzine. Where a paste filler sets too quick—that is, gets hard before the finisher has a chance to rub it in—it is advisable to add a small quantity of boiled linseed oil, which, if used in excess, will retard the drying. A short, heavy brush to apply the filler should be used, and the material must be thoroughly worked crossways so as to rub into the pores as much filler as possible. This will make the after work easier. The finishers as a general rule apply the filler in a very easy manner, simply trying to get it on the surface and relying entirely on the rubbing in, which is a wrong idea. After the filler is applied it should be allowed to set—that is, sufficient time should be given to let part of the turpentine evaporate until the surface appears "flat"—and then it must be thoroughly rubbed crossways into the pores. This process is called packing and requires some experience. The packing or rubbing in itself is done with a piece of bagging or some similar kind of coarse cloth. A good many finishers use excelsior or shavings, but those articles are not as practical, as they are liable to pull out part of the filler again, especially in the hands of an inexperienced person. After assuring yourself that the pores have been properly filled the work must be slightly wiped off with a piece of soft cloth to remove any traces of filler which may have been left by the use of the coarse cloth being filled up with an excess of the material. If at any time the filler has set too hard—that is, if it is partly dried up so as to make the rubbing in impossible or difficult—a small amount of turpentine placed on the rubbing cloth or, still better, a brushing over the surface with turpentine will remedy the trouble.

Before the next coatings are applied from 24 to 48 hours must be allowed for drying. Some finishers make a great mistake in hurrying the work right after filling, believing no harm is done, whereas in fact the most harm to the final finish has been done. Proper filling lightens the work in after finishing considerably, therefore some finishers believe in applying two coats of paste filler, with good results. The second coat of filler is applied and treated the same as the first coat, a slight sandpapering between coats being beneficial. A second coat of paste filler is of course only necessary on very coarse grained or open pored woods, such as ash, oak, certain kinds of mahogany, walnut, &c. For filling small moldings and carvings, properly speaking, for cleaning the filler out of them, a few plain tools are required.

In the first place a pointed wooden pick, easily made from any kind of a piece of hardwood, is used in cleaning the remaining filler out of the corners and crevices. Iron or other metal tools must not be used, as those will leave black streaks, providing a good, pure silex paste filler has been used. Neither should steel wool be used instead of sandpaper for smoothing down. It is best to use a small wooden hand brush, with or without handle, which may be made of tampico, but a better grade of stiff bristle brush of the same shape is much to be preferred, being more durable and practical. This brush is used for cleaning carvings and deeper lying parts of the work where it is impossible to apply the cloth.

There is little more to be said about the use of paste fillers, as the finisher has to find out the fine points of this class of work by continual practical experience. The filling of close grained wood with paste filler has been often discussed and laughed at by a good many, but it is done very frequently, and some beautiful effects are produced with colored fillers on so-called burly or curly woods. North Carolina curly pine treated with a colored paste filler will produce such varieties of effects that it is at times impossible to detect the original.

Liquid Fillers.

Liquid fillers belong to the class of first coaters or surfacers because they are not fillers in the proper sense of the word, but are used to stop the suction of the wood and to form an underground or base for the subsequent coatings. Liquid fillers are not rubbed into the pores of the wood, but simply brushed over the surface in a somewhat similar manner to varnish. It is not recommended to use colored liquid fillers, because it is a peculiarity of silex and other material used as a base for liquid filler that the smallest addition of color will make them very opaque and transform them into a paintlike substance, with the result of covering the natural grain of the wood and clouding the general appearance.

A great humbug and fake business is frequently done under the name of liquid fillers. Many cases are known where painters or finishers who are under contract to use a liquid filler on a given job go to work and buy ordinary ceiling or rosin varnish with the order to have it sent to the job marked "liquid filler," and some unscrupulous manufacturers are doing the same thing in selling those improper finishing materials under the spurious name of "liquid filler" to the unsuspecting buyer. Advice is hereby given: If you do not buy your liquid filler from a responsible firm you may prefer to mix such a filler yourself, which is easily done, thereby saving the price of the cans, manufacturing expenses and profit.

Formula for Liquid Filler.

Take a gallon of a medium good varnish, inside coach varnish preferred, and add to it from three to five pounds of a pure silex paste filler. Stir up or mix properly and thin down with turpentine or benzine, and you have as good a liquid filler as you can buy at any price. The quality of the filler will rest with the quality of the varnish used for it. The test of a good liquid filler is the same as previously given for paste filler. Liquid filler should also be allowed to dry from 24 to 48 hours, according to weather conditions, and must be sandpapered before subsequent coatings are applied.

Liquid filler cannot or should not be used for any open pored or coarse grained wood, but its use is restricted to close grained wood. But liquid filler can be used as an after coating over paste filler with good results, and in this case it is much preferable to a coat of cheap varnish, because it will stop suction to a better advantage and will prevent the sinking in of the succeeding coats of varnish.

Strikes in New Jersey.

Strikes reported to the Bureau of Statistics of New Jersey numbered 74 in 1905. In no instance was an effort made by either side to arbitrate differences, though New Jersey has a State Board of Arbitration. The greater number of the year's strikes were by workmen in the building trades, principally bricklayers, plumbers, carpenters, painters, lathers, plasterers and electricians. The causes are distributed as follows: Increase in wages, 26; against a reduction in wages, 10; against members of rival unions, 4; against the employment of nonunion men, 12; for a shorter workday, 4; increase of wages and shorter workday, 2; against employment of workmen from outside localities, 1. Of the total, 22 strikes are reported to have been wholly successful, 17 partly successful, a compromise agreement being reached, while the remaining 35 strikes failed completely.

LAYING AND FINISHING HARDWOOD FLOORS.*

By Frank G. Odell.

THE portion of our topic relating to estimating is approached with some degree of timidity. There is probably no business in existence of equal magnitude in which there is so manifest lack of system in estimating as that of the building contractor. Lack of close association between builders, coupled with the natural distrust incident to a business handled in comparatively small individual contracts, under active competition among a class of men (pardon me for speaknig plainly, the truth demands it) whose limited opportunities for general business training naturally unfit them for close specialization even along the lines of their own particular industry, has left this whole problem in a chaotic state, except for such chance ray of light as is occasionally afforded by some member of the architectural profession, who gives us an article or a treatise upon this subject.

These chance contributions from our friends of the learned profession referred to, while excellent in their way, usually lack the very essential element of intimate personal observation and experience on the part of the man who really conducts the business—*i. e.*, the builder himself. It is entirely possible for a group of public spirited builders in any given community to tabulate the results of their every day business for a period of, say, one year, and after a little careful comparison of notes to establish a fairly accurate basis of estimating for that given locality. To be sure, if such a reprehensible practice were indulged in and the aforesaid builders were to thereby establish their business upon a paying basis, it would to a certain extent eliminate competition, and possibly result in some of the building craft making an honest dollar occasionally.

Elevating the Trade.

Certainly it would result in a gradual raising of a trade to the dignity of a business enterprise, and the saving to the community in absence of liens, law suits and inferior building, now resulting from the present haphazard methods would be beyond computation.

But, so far as the writer's knowledge extends, that locality is yet to be found where the building fraternity in a spirit of mutual helpfulness and a desire to benefit their individual condition have undertaken any such systematic investigation as is here suggested.

It was definitely tried once in an association of builders by a committee of which the writer was a member, but we soon ascertained that there was a general fear among our brethren that in our individual wisdom some of us might impart some knowledge peculiar to himself, which would place an added advantage in the hands of his competitors, and so the project fell through; not without some beneficial results, however, for the investigations of the committee and the general expression of the contractors in discussing the subject developed the existence of a state of facts probably not peculiar to the locality in question—viz., that among our particular group of builders, to whom fell the majority of the business in a city of 50,000 people, there was not one who had any system of estimating on which he felt that he could rely with reasonable confidence.

I have wondered often since if this condition prevails in the country at large; if one may judge by the differences of opinion expressed in your correspondence columns the condition exists in epidemic proportions and heroic treatment is necessary.

The chief problem in the organization of any business enterprise is the determination of the ratio of expense to quantity of product. No system of estimating for any business can be fixed with any certainty until this ratio is ascertained with approximate correctness. The more nearly this approximation approaches to a definite and fixed ratio, strictly dependable, the more certain will be the element of profit, which will in such a case become a mere question of percentage in the successful operation of the business.

The successful contractor of to-day and of the future must specialize his business to that point where it can be operated along similar lines. A definite percentage of profit, though small, if regularly adhered to, affords a more certain income than the hit and miss sort of calculation, so common among the building fraternity. Rigid adherance to system in the organization of a business has the inevitable tendency to eliminate waste, and profit is the natural result.

The writer recalls a form of estimating in vogue durin his "'prentice" days; the "boss" would look over the plans or survey the proposed job and after ruminating a while "reckon that we can do that 'ere job in so many days' work." That fixed the labor cost unless Smith and Brown were figuring. Smith and Brown were proverbially low, and in case they were competitors it was always necessary to knock off a few dollars to ensure the job. These preliminaries accomplished, the "boss" would make up the material bills and reckon up the general contract. Such a thing as a definite relation between the labor cost and the quantity of material to be handled did not usually enter into the calculation, unless it might intuitively creep in during the ruminating over the number of days' work.

To be perfectly honest, have we not all done similar estimating in our callow days, when the responsibilities of having a job of our own loomed large on our horizon?

We are learning better now, but there is still great lack of definite system in estimating labor cost. The vast variety of work in these days is further complicated by the lack of thorough training in the crafts, and the labor item is the one uncertain factor in the building problem. The system of estimating used by the individual contractor must be largely peculiar to himself and based on his personal experience; like all experience, it is likely to be expensive in the acquirement, and he will the more profit by carefully heeding it. The more accurately it is checked up with his daily business the more certain will be his profit on that job, or some future one.

How many contractors are there who can turn to the record of a given job and tell how much it cost to place the dimension lumber in the building, put on the sheathing, lay the floor, siding and shingles and put on the trim? If he had a record of this sort for a dozen jobs how simple it would be to figure a similar job with some certainty. Again, how many builders are there who can tell with any certainty on what particular portion of a given job they made or lost money? A grocer who bought eggs for 20 cents a dozen and sold them for 15 cents, expecting to make back the loss by the sale of sugar or coffee, would speedily "go broke" if he managed his entire business on such lines. The building trade is no exception to the general law of business success.

System an Important Factor.

We feel impelled to make these general observations in taking up the subject of estimating the cost of floors, believing that system is the one essential for the contractor. The journeyman has his union and his wage scale; he knows how many dollars will come to him for a given number of hours' work; but his employer does not know with any certainty what quantity of labor he will get for his money or what will be his percentage of profit. There is a screw loose here that needs adjusting badly, and until the intelligent and fairly successful contractor lends his energy to the solving of this problem he will waste his time complaining about irresponsible competition from embryo contractors.

It is entirely possible to fix a rule for estimating "straight work"—*i. e.*, work of a given class done under normal conditions. The factors entering into the primary calculation will be:

a. The quantity of materials.
b. Wage scale and number of hours per day.
c. Relative cost of similar work on preceding jobs under parallel conditions.

---

* Continued from page 86, March issue.

Should factor "c" not be available the best possible estimate must be made and record kept until this factor can be determined with some certainty.

The foregoing factors being available, it should be comparatively easy to tabulate a fairly accurate basis of estimating for work of any given class, composed again of three factors—viz.:

a. Quantity of materials.

b. Labor cost per unit of quantity.

c. Percentage of profit.

The unit of quantity may be variable in the case of different varieties of work, as:

a. The square of 100 square feet for sheathing, rough floors, siding, &c.

b. The price per 1000 feet board measure, as handling common or heavy dimension for any certain type of building.

c. The price per piece or per opening, as doors and windows, or casing.

d. The price per 1000 for shingling under specified conditions (all fast men barred).

e. The price per lineal foot, as for cornice work of given type, baseboards, chair rail and general work of any character which cannot be otherwise estimated.

The particular form of calculation is nonessential so long as the definite relation is sustained between the quantity of work to be performed and the cost per unit of quantity, this relation always being based on actual experience of work performed under normal conditions.

It should be said also that no system of estimating is worthy of consideration which does not comprehend a definite percentage of profit, which should be invariably figured and rigidly adhered to. If some other fellow is content to work for nothing and board himself, do not voluntarily place yourself in his class for the sake of beating him at his own game.

Forms for Estimates.

This matter of estimating involves another important matter, that of systematically arranged forms for making out estimates. A regular form of printed blank which takes up in detail the various items entering into the construction of a modern building is indispensable. The writer has used such a form in his business for years and it affords a record of past transactions which is invaluable for reference. This form subsequently came into general use in a limited area, and fellow contractors pronounce it a valuable aid in systematizing their business.

In estimating the cost of finished hard wood floors the initial item of expense is the labor cost. Our experience has determined a fair price for the labor item to be 7 cents per square foot for laying and smoothing, based on 2-inch face floor of good quality in rooms of average size, with a wage scale of 35 cents per hour and an eight-hour day. This price will include cutting off doors for adjacent openings and nailing down the quarter round, but will not justify an unusual amount of leveling up of old under floor; this should invariably be figured as an extra, or done on a special understanding by the hour, with a charge of 10 per cent. for the service.

For this locality the above price has proved correct and is the basis used for nearly all our leading contractors for several years past, being modified only by changes in the wage scale. The square foot is the most convenient unit of calculation and the price indicated will ordinarily afford a profit of 10 per cent. to the contractor if experienced workmen are put on the job.

The labor item divides about thus:

Laying the floor, per square foot	2 cents
Scraping and sanding, per square foot	5 cents.
Total	7 cents.

To this amount add the cost of the material, including the necessary amount for matching and waste, which will require one-third for 2 inch and one-fourth for 4-inch floor. This method of calculation may be best illustrated by a simple problem: "Figure the cost of furnishing, laying and finishing yellow pine 2-inch quarter sawed yellow pine floor for a room 10 x 10 feet, the price of flooring being $40 per thousand feet":

100 square feet floor plus one-third for matching equals 133 1-3 square feet, at 4 cents, or	$5.33
Laying and scraping 100 square feet, at 7 cents	7.00
Filler and two coats varnish or wax, at 5½ cents per square foot	5.50
Total	$17.83

Price per square foot, laid and finished complete, 18 cents.

We usually figure such a floor from 18 to 25 cents per square foot, according to conditions of the job, reserving the privilege of superintending the painter's work in order to ensure a good job. The Master Painters' shop scale for work of this character in this locality is 50 cents per square yard, being based on a wage scale of 35 cents per hour and a nine-hour day.

Efficiency of Workmen.

As a matter of fact, more depends on the efficiency of the individual workman than on wage scale or hours of labor, and a little careful accounting on work under progress will enable the contractor to fix a satisfactory price. We prefer the square foot as the unit of calculation, as it affords an easy and rapid method of computation and enables the contractor to give an estimate at once when called in on the job. It is essential of course that a definite table of prices be fixed beforehand, based on prices of materials and quality of work which prevail in the given locality.

The above prices for carpenter's and painter's work are ample for first-class work and will include the necessary materials for the painter's work. The figures above given are based on my personal observation and records of perhaps 50 different jobs covering a period of some five years, and compare closely with the experience of fellow contractors who have done business under the same conditions. I think they will be found sufficiently accurate for general use where similar conditions prevail. The proportions may be easily changed to suit any change in price of materials or labor.

A few further illustrations may serve to make this form of estimating clear to the reader.

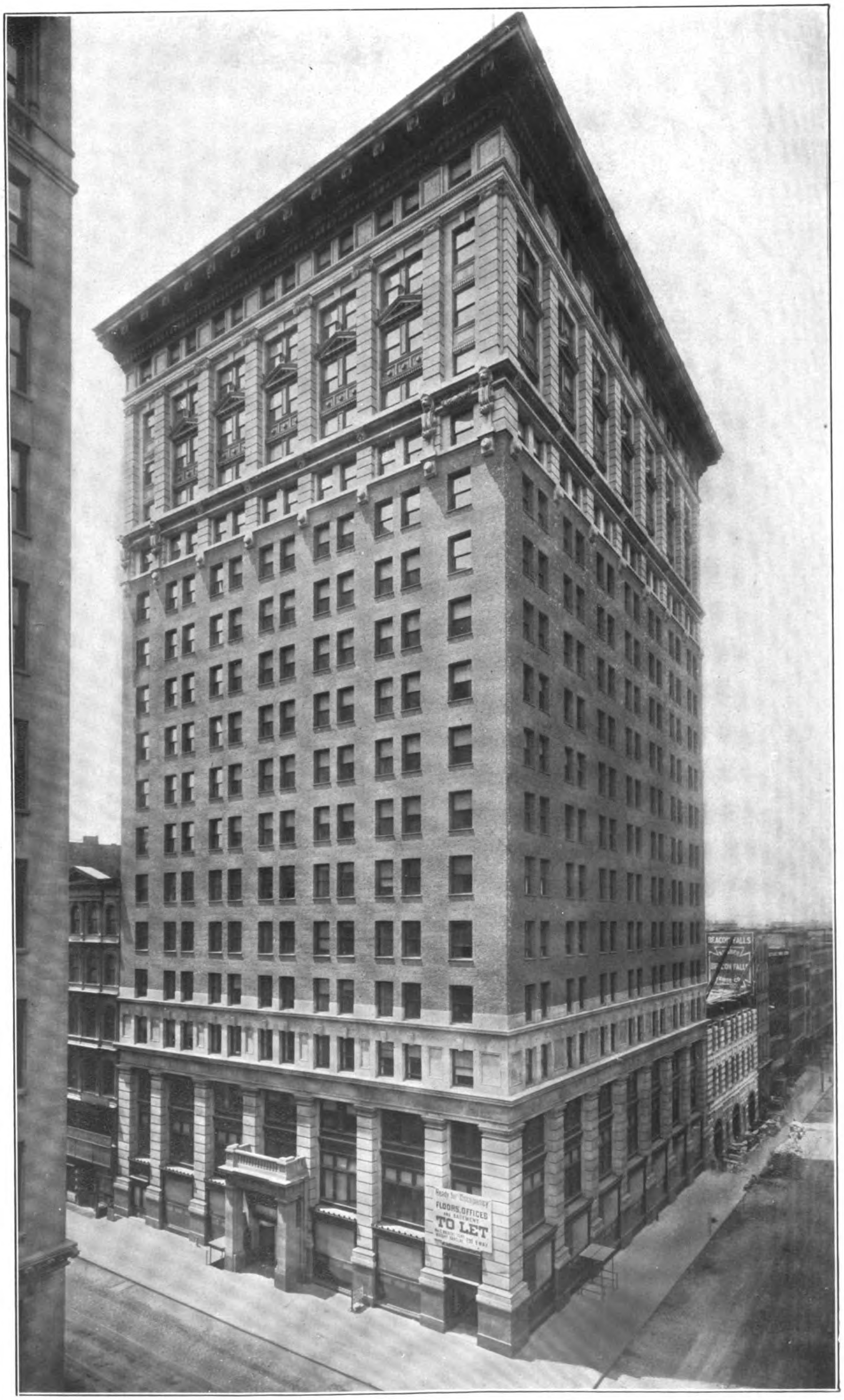
Present prices at Missouri River points for hard wood flooring are as follows:

4-inch clear y. p., per 1000 feet	$40.00
3-inch or 4-inch v. g., y. p., per 1000 feet	45.00
⅜ plain oak, 2-inch face, per 1000 feet	60.00
⅜ q. s. oak, 2-inch face, per 1000 feet	80.00
⅜ selected maple, 2-inch face, per 1000 feet	75.00

On the basis of these prices the calculation for furnishing 100 square feet of each variety of floor would be as follows:

4-inch y. p., at $40 per 1000 feet:	
100 square feet (add ¼), 125 feet, at 4 cents	$5.00
Carpenter's labor, at 7 cents	7.00
Painter's labor, at 5½ cents	5.50
Total, 100 square feet	$17.50
Price per square foot, complete, 17½ cents.	
3-inch y. p., at $45 per 1000 feet:	
100 square feet (add 1-3), 133 1-3 feet, at 4.5 cents	$6.00
Carpenter	7.00
Painter	5.50
Total, 100 square feet	**$18.50**
Price per square foot, 18½ cents.	
Plain oak, 2-inch face, at $60 per 1000 feet:	
100 square feet (add 1-3), 133 1-3 feet, at 6 cents	$8.00
Carpenter	7.00
Painter	5.50
Total, 100 square feet	$20.50
Price per square foot, 20½ cents.	
Quarter sawed oak, 2-inch face, at $80 per 1000 feet:	
100 square feet (add 1-3), 133 1-3 feet, at 8 cents	$10.67
Carpenter	7.00
Painter	5.50
Total, 100 square feet	$23.17
Price per square foot, 23.17 cents.	
Maple, 2-inch face, at $75 per 1000 feet:	
100 square feet (add 1-3), 133 1-3 feet, at 7.5 cents	$10.00
Carpenter	7.00
Painter	5.50
Total, 100 square feet	$22.50
Price per square foot, 22½ cents.	

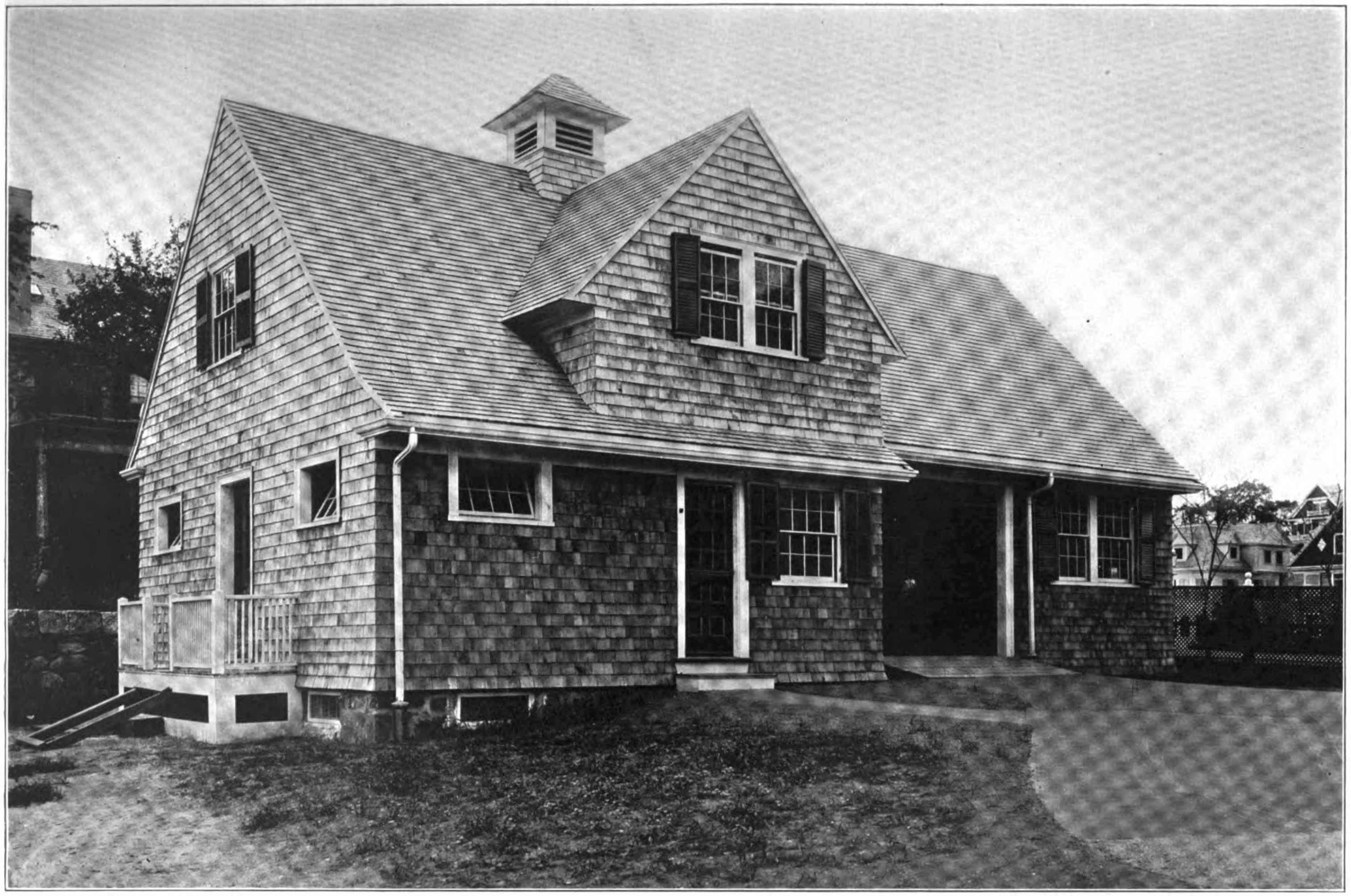
The average customer will pay more in proportion for oak or maple than for pine and feel better satisfied, and the contractor will be fully justified in adding 10 per cent. to the estimated price for the 2-inch face thin



A NEW YORK SKYSCRAPER—THE BARCLAY BUILDING.

S. B. COLT, ARCHITECT.

SUPPLEMENT CARPENTRY AND BUILDING, APRIL, 1906



SHINGLED CARRIAGE HOUSE AND STABLE OF MR. GEORGE M. GLAZIER, EVANS ROAD AND WASHINGTON STREET, BROOKLINE, MASS.

LORING & PHIPPS, ARCHITECTS.

SUPPLEMENT CARPENTRY AND BUILDING, APRIL, 1906.

flooring, inasmuch as it requires special care and considerable extra face nailing. The foregoing examples give a sufficient guide to the novice in estimating, so that individual calculations may be made, based upon any change in prices of materials and the work undertaken, with a reasonable expectation of profit.

Rough or Lining Floors.

The estimates indicated above are based on the laying of the finished floor only and do not comprehend the laying of any under floor. If under floors or paper lining between floors are required the additional cost should be computed and added to the estimate. We usually figure $1.50 per 1000 feet for laying rough floors of common lumber or shiplap in a new building. If in an old building one must be governed entirely by the specific conditions, as no two cases are alike; as previously suggested, the safest practice is to do such work by the hour as an extra, charging 10 per cent. for the service.

Floors Finished After Plaster.

Should specifications require finishing floors after plastering add cost of two thicknesses of building paper to protect the floor and 50 per cent. extra to the carpenter labor in cleaning the floor. It is a fairly safe calculation to figure 10 cents per square foot for laying, protecting and finishing such floors, and at this apparently exorbitant price the contractor will not fare as well as on ordinary work. A fair example of this sort of work would be as follows:

"Compute cost, laid, protected with building paper, and finished after plaster of 4-inch y. p. floor at $35 per 1000 feet, for a building 26 x 30 feet."

26 × 30 = 780 square feet (add ¼), 975 feet, at 3.5 cents.	$34.12
Carpenter, 780 feet at 10 cents........................	78.00
Total cost..	$112.12
Price per square foot, 14⅜ cents.	

To this must be added nails and painters' labor and materials. The price for the latter will vary somewhat, as a cheaper finish is customarily used on floors of this character. It will be seen, however, that wherever it is desired to have a finished floor it will pay to lay a lining of common boards and not bring the finish floor into the building until plasterers are gone.

Parquetry, or inlaid floors, sometimes called wood carpet, are the highest type of art in wood work. They are made in great variety of patterns, usually composed of geometrical figures which adapt themselves readily to expression by means of straight lines, and a beautiful effect is secured by the joining of different colored woods.

These floors are now made in large factories specially equipped for the purpose, and their designers are among the highest paid class of art workers. The cost is determined by the intricacies of the pattern and the variety and rarity of the woods used. Inasmuch as the beauty of parquetry is dependent on color, it is not practical to illustrate it in the limits of this article. The reader who is interested in this style of work will do well to send for the catalogues illustrated by the firms who advertise in this magazine.

The cost of laying parquetry floors is fixed largely by the character of the pattern and the shape of the room. The better plan is to furnish the factory with a plan of the room, drawn to scale and showing all angles, chimney projections at the floor line, etc., in order that the pattern may be made up to fit the outline of the room.

Parquetry is usually made up of a fancy border of parti-colored woods and a center, called "the field," composed of alternate strips about 1½ inches wide of contrasting varieties of wood. The sort in most common use is the thin variety, which is face nailed directly to the under floors with brads. The borders are glued to a soft wood backing and built up in squares so that they may be easily joined by any good mechanic.

Ordinary parquetry floor should bring twice as much for the labor of laying as plain hard wood floor, inasmuch as the small pieces composing the pattern require more frequent nailing and the exercise of unusual care for the entire job. Detailed instructions for laying are sent out with the stock from the factory, and no difficulty will be experienced by the workman if care is exercised.

The cost of finished parquetry is about the same as the more expensive grades of fine carpeting for the same space. The number of people of good taste who are giving preference to parquetry over carpets is constantly increasing, and an opening exists in every good sized town for the building up of a profitable specialty in laying and finishing this beautiful flooring material.

WAGES IN BUILDING TRADES IN NEW YORK STATE.

IN view of the general activity which prevails in the building line and the promising outlook for the coming season it is interesting to note the prevailing rates of wages in the various branches of this particular branch of industry. As showing the wages paid in the leading cities of New York State and some of the cities of Ohio and Pennsylvania we present herewith a table in which the wage scale is compiled on an hourly basis and is revised to March 15 of the current year. It was compiled for the New York State Association of Builders by its enterprising secretary, James M. Carter, and in comparing the figures presented in the table with those prevailing in the corresponding branches of trade a year ago a number of notable changes will be apparent, all in the nature of an advance. This table is sent out in the form of a folder and constitutes a most interesting and valuable contribution to the literature of the building business.

	Bricklayers.	Carpenters.	Cement finishers.	Electricians.	Hoisting engineers.	Laborers.	Lathers.	Painters.	Plasterers.	Plumbers.	Stone masons.	Stone cutters.	Steam fitters.	Structural iron workers.	Sheet metal workers.
Albany, N. Y.....	50	31-36¼	50	37½	$3.00	25	45	34⅜	50	43¾	50	45	43¾	45	50
Bath, N. Y.......	30.35	25-30	..	..	..	15	$1.50 m.	25	35	..	35	..	..	..	..
Binghamton, N. Y.	50	25	40	25	$12 wk.	25	$1.50 m.	25	45	37½	43¾	43¾	26⅞	..	26⅞
Buffalo, N. Y.....	50	37½	45	37½	$21 wk.	17-22	$2.00 m.	37½	50	43½	45	50	43½	50	35
Elmira, N. Y.....	50	$2.50 9 hrs	..	..	..	25	$1.60	$2.50	50	..	45	45	..	..	..
Ithaca, N. Y.....	50	31½	..	..	..	17-22	....	25-28	50	37⅝	45	50	37½	..	28⅛
Jamestown, N. Y.	50	30⅝	..	..	$2.25 d.	20	....	27⅞	40	36	45	45	36	..	27⅞
NewYork, N. Y...	70	56¼	60	$4.00	$5.00	37½	50	50	$5.50	$5.00	56¼	62½	56¼	56¼	$4.50
Niagara Falls, N.Y.	50	37½	50	37½	30	20	3c. yd	31¼	45	37½	50	50	37½	50	37½
Olean, N. Y......	55⅝	27½	40	..	27½	22⅛	3c. yd.	25	40	30½	39	40	30½	..	30½
Rochester, N. Y..	53	37½	31¼	37½	$3.00	21-23	$3.00 d.	$2.75	53	40	53	50	40	40	..
Syracuse, N. Y...	50	30-35	25-35	35	35	20	45 and 50	32	50	38	50	40	38	50	30-40
Troy, N. Y......	50	35	30	30⅝	$2.50 d.	15-25	$2.00 m.	34⅜	50	34⅜	50	50	34⅜	..	31¼
Utica, N. Y.......	50	34⅜	50	25	31¼	$2.00	$1.50 m.	28	45	40	45	45	30	25	40
Watertown, N. Y..	45	27½	45	45	25	22½	$2.00 m.	37½	50	45	50	50	41½	50	..
Cleveland, Ohio..	55-60	40	40-50	43¾	35	25	4c. yd.	37½	56¼	50	45	50	44	50	37½
Columbus, Ohio..	55	37½	35	35	30	28½-31¼	45	30	50	40	50	50	43¾	50	35
Erie, Pa.........	50	30	33⅓	30	..	20-25	3c. yd.	25	33⅓	37½	45	40	37½	45	25-30
Pittsburgh, Pa....	60	43¾	..	50	37½	35	40	42½	52½	50	50	50	50	50	42½
Toledo, Ohio.....	60	30-35	20-27½	50	35	25-28	45	31¼	50	43¾	50-55	50	37½	40	30-45

A FRAME CARRIAGE HOUSE AND STABLE.

(*With Supplemental Plate.*)

A SHORT time ago we presented in these columns illustrations of the residence of George M. Glazier in Brookline, Mass., and in this issue we take pleasure in bringing to the attention of our readers the plans of the carriage house and stable belonging to the dwelling in question. The half-tone view which serves as the basis of one of the supplemental plates accompanying this number of the paper clearly shows the external appearance of the finished structure, while the plan clearly indicates the interior arrangement.

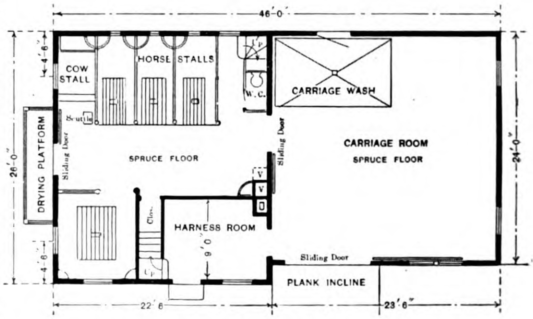
According to the specifications of the architects the foundations are of quarried stone, the walls to the grade line being 1 foot 8 inches thick, laid in cement mortar in the proportions of 1 to 3, while above grade the walls are 1 foot 6 inches thick. The outside joints are pointed with cement mortar and lined. All foundation walls extend 4 feet below the finished grade and have a cobble stone drain underneath pitched to one corner. The cellar is 6½ feet high. The brick piers are 12 inches square, resting on stone foundations which are 8 inches larger on all sides than the piers.

Front Elevation.—Scale, ⅛ Inch to the Foot.

The building is framed with spruce, the posts being 4 x 8 inches, and the outside studding 2 x 4 inches, placed 16 inches on centers. All studding and joists in the carriage room are planed. The frame of the building is covered with ⅞-inch spruce boards planed to a thickness, all boards being matched and having the planed side in. Over these sheathing boards is a layer of Neponset black sheathing paper, which in turn is covered with cedar shingles laid 5 inches to the weather and fastened with Swede iron nails. The roof is framed with 2 x 6 inch rafters, placed 20 inches on centers, covered with ⅞-inch planed sheathing boards, so laid as to break joints once in every five boards. On these are laid cedar shingles exposed 5 inches to the weather. All valleys are laid close, and have pieces of 10-ounce zinc to lap under the shingles 6 inches on each side.

The first floor joists are 2 x 8 inches, and the second floor joists 2 x 10 inches, all spaced 16 inches on centers. The floors are bridged with 1 x 3 inch pieces cut in diagonally and well nailed. The first and second story floors are boarded with ⅞-inch spruce planed to a thickness, and the boards of the second floor are put on with the planed side up. The finished floor in the first story and in the finished rooms of the second story are laid with ⅞-inch spruce floor boards planed and not over 5 inches in width. The floor of the harness room is of ⅞-inch Alabama rift hard pine in equal widths of ¾ inch. The drying platform is laid with ⅞-inch rift hard pine floor boards ½ inch apart. The inclined approach to the front doors is of 2-inch hard pine plank resting on 4 x 6 inch joists.

The main partitions in the first story are of 2 x 4 inch studding and ⅞-inch matched North Carolina pine sheathing beaded in equal widths of 3½ inches. The partitions between the stalls are of 1¾-inch hard pine plank 4 feet high in equal widths of 6 inches, with hard pine moldings on top finished with iron guard. The partitions for the box stalls are of 1¾-inch hard pine beaded sheathing, with rail and iron guards. At the foot of the stalls are turned hard pine posts extending from the beam in the first floor to the beam in the second floor. The common and box stalls are fitted with the Lynn stall basin and floor, iron basins and rock maple floor, strainer with trap, &c. The carriage wash is made by hewing the joists down and then laying two thicknesses of ⅞-inch spruce. In the center is a cesspool of the Lynn Stall Company's make.



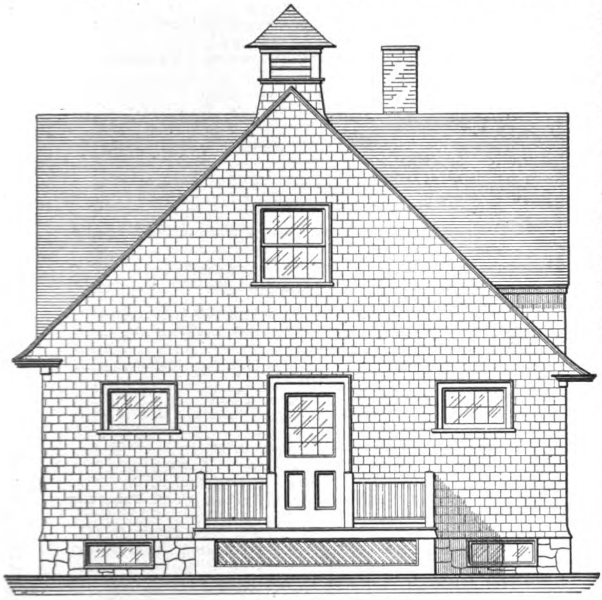
Main Floor Plan.—Scale, 1-16 Inch to the Foot.

*Frame Carriage House and Stable.—**Loring & Phipps**, Architects, **Boston, Mass.***

All walls and ceilings of the first story except the

carriage room are sheathed with ⅞-inch North Carolina pine, matched and beaded in equal widths of 2½ inches. In the second-story floor is a scuttle constructed of two thicknesses of ⅞-inch spruce sheathing put together crossways with iron screws and hung with heavy iron hinges. The hay chutes are made of ¾-inch spruce beaded sheathing, the lower ends being fitted to iron gratings and the upper ends to extend 1 foot above the floor and fitted with ⅞-inch pine lids hung with stout iron hinges.

The main sliding doors are of white pine 2¼ inches thick, while all other outside doors are of white pine 1¾ inches thick. Inside sliding doors are of 1¾-inch cypress, and other inside doors are of the four-panel type, made of 1½-inch cypress. All swinging doors have 1½-inch rebated plank frames of North Carolina pine. The windows in the outside wall have white pine sash and are hung with pulleys and weights. The sash are glazed with German double thick sheet glass. All inside finish is of North Carolina pine. The grain bins are of planed hemlock with tops hung with iron hinges. All closets are fitted with shelves and a row of double iron hooks on ⅞-inch strips. The stairs have 2-inch plank stringers and ⅞-inch hard pine treads and risers.



End (Left) Elevation.

All outside pine finish has three coats of best lead and oil, while the inside finish has one coat of shellac and two coats of varnish. The sash are stained red inside, and given two coats of varnish and are painted outside. All hard pine floors have two coats of best linseed oil.

The plumbing fixtures include a short hopper water closet, with lead trap, copper lined tank and cherry seat on iron brackets. A 4-inch cast iron pipe connects the cesspools in the stalls with the drain, each cesspool being trapped. The carriage wash has a 3-inch cast iron pipe from the trap underneath to the cesspool outside.

Back of the stalls is one of W. A. Snow & Co.'s half circle watering troughs with patent overflow, plug and strainer. The trough is 25 x 13 x 12 inches, fitted with ⅝-inch compression bib for cold water and 1¼-inch waste to a 4-inch lead pot trap.

The drawings of this carriage house and stable were prepared by Loring & Phipps, architects, 53 State street, Boston, Mass.

◆

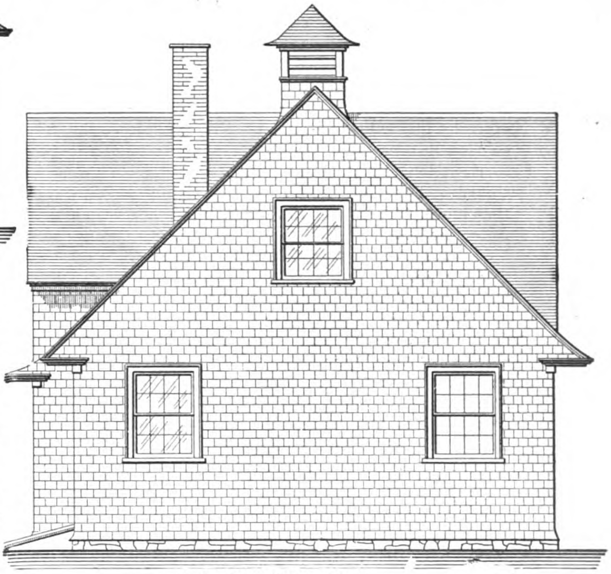
A BULLETIN describing the life history of the white pine tree, its requirements as to soil, light and moisture, as well as the development of white pine wood on old fields and pastures in New England, has been issued by the United States Department of Agriculture, Washington, D. C. Present lumbering methods are discussed, together with the right of way to secure reproduction when cutting white pine wood lots. It is known as Bulletin No. 63 and has been prepared by S. N. Spring of the Department of Forestry.

◆

A Private Dwelling Without a Chimney.

A thoroughly modern and up to date dwelling which possesses the unique distinction of having no chimney whatever is located in Schenectady, N. Y., the only pipe of any kind extending through the roof or sides of the house being the ventilating pipe from the bathrooms required by the city ordinance. The residence was erected a short time ago for H. W. Hillman, who, much to the architect's surprise, insisted that no provision be made for a chimney. The reason for this is that everything in this twentieth century home is accomplished by electricity—the cooking, the lighting, the laundry work and a number of minor things that continually surprise a visitor. From an account given by one who was privileged to inspect the home we take the following particulars:

On a visit to this wonderful residence the servant answers the ring of the electric bell and the door mysteriously swings open as the servant enters the hall, notwithstanding the fact that it was securely locked but the moment before. As one enters the reception room the lights flash up softly behind the ground glass globes, having been turned on by the servant from a concealed switch in the hall. The room is heated with a large, luminous radiator, which diffuses a soft glow and a pleasant heat from the three-radiator lamps which are the heating element of the novel stove. There can be no loss of oxygen in the room with this heating apparatus, nor is there the slightest odor. Every room in the house is heated in this strange yet perfect manner.



End (Right) Elevation.

Frame Carriage House and Stable.—Elevations.—Scale, 1-8 Inch to the Foot.

The host appears and after a few minutes' chat visitors are invited to the novelty of partaking of an electrically prepared luncheon. The lights flash up in the dining room, homelike with its pleasant harmony of color, shining silver and white linen. On the table stands an electric coffee percolator. This is an ornamental affair of copper, heavily nickel plated, with a glass top wherein the coffee is ready to serve. Two small wires into the base tell the secret of the heating apparatus. On the sideboard a Welsh rarebit is steaming in an electric chafing dish. Of a truth there never was a better cup of coffee or a better tasting rarebit.

After luncheon the guests are cheerfully invited to make an examination of a few of the principal wonders of the electric house.

Of course the kitchen is the chief place of interest, where a fire is the most essential thing. Most wonderful is the fact that the kitchen range is of heavy oak. In design it bears a resemblance to the mission style of furniture, not unlike a heavy table with a shelf next to the floor and a high back. Upon this unique stove steam and bubble a number of utensils containing fragrant and appetizing viands. A water heater is boiling, vegetables are steaming, meat is broiling, other strange dishes are steaming, and without any apparent fire. Other utensils, such as the electric griddle for baking cakes, electric frying pans of various sizes, combination electric cereal cooker, &c., stand about not in use. Switches at the back of the stove control the heat. On a shelf beneath is the electric oven, which works perfectly. The kitchen is heated by electricity.

The laundry is the next room to be visited. Here the water is heated by electricity, and we see the electric flatiron, which is always at an even temperature from the start to the finish of the work.

The water for the bath is heated by electricity. Table lamps light the library and other rooms and luminous radiators heat the guest chambers.

Investigation of Structural Materials.

The United States Geological Survey has entered upon the technical investigation of fuels and structural materials in response to the general public demand for information on the subject rather than from any theoretical considerations, and this increasing demand for information, coming from engineers, architects and builders in all parts of the country, caused by the rapid changes which are taking place in the materials used for construction work, has caused Charles D. Walcott, director of the Geological Survey, to recommend in a report to the Secretary of the Interior both that the investigation of structural materials be continued and that the appropriation for it be largely increased. In his letter Director Walcott sets forth at length the reasons why this work should be continued and enlarged, and at the same time it is suggested that more elaborate investigations be conducted along the following lines:

1. The more thorough examination in the field of the sands, clays, cement materials, cement, stone, &c., such as may be used for building purposes and in general construction work.

2. The more thorough examination in the testing laboratories of these materials as to their strength, durability, elasticity, permeability, resistance to fire or freezing and other properties, such as would influence, directly or indirectly, their value as materials for building or construction, either when used alone or in association with other materials.

3. The more thorough investigation of cements and mortars and the use of these in association with sand, stone and steel in the form of concrete and reinforced concrete as to their strength, elasticity, permeability, durability, resistance to fire and freezing, their behavior under fresh water, salt water, &c.

4. The investigation of clays, clay products and other substances used in connection with building and construction work as to their strength, elasticity, permeability, behavior under heat and cold and other chemical and physical properties.

5. The testing of stone largely used in construction work in different parts of the country as to its nature and composition, its strength, porosity and its quality for resisting fire, frost, &c., and its adaptability for use in construction work, either alone or with cement in concrete or with stone and steel in reinforced concrete.

The following is a list of the names of members constituting a national advisory board on fuels and structural materials under the advice of which these investigations by the Geological Survey and also the timber and timber treating investigations by the United States Forest Service are to be conducted:

From the American Institute of Mining Engineers:
John Hays Hammond, past president, Empire Building, New York.
Robert W. Hunt (of Robert W. Hunt & Co., testing engineers, Chicago, Pittsburgh and New York), Chicago, Ill.
B. F. Bush, manager and vice-president, Western Coal & Mining Company, St. Louis, Mo.

From the American Institute of Electrical Engineers:
Francis B. Crocker, professor of electrical engineering, Columbia University, New York.
Henry C. Stott, superintendent motive power, Interborough Rapid Transit Company, New York.

From the American Society of Civil Engineers:
C. C. Schneider, president, chairman Committee on Concrete and Reinforced Concrete, Pennsylvania Building, Philadelphia, Pa.
George S. Webster, chairman Committee on Cement Specifications, City Engineer, City Hall, Philadelphia, Pa.

From the American Society of Mechanical Engineers:
W. F. H. Goss, dean of the school of engineering, Purdue University, Lafayette, Ind.
George H. Barrus, steam engineer, Pemberton square, Boston, Mass.
P. W. Gates, 210 State street, Chicago, Ill.

From the American Society for Testing Materials:
Charles B. Dudley, president, Altoona, Pa.
Robert W. Lesley, vice-president, Pennsylvania Building, Philadelphia, Pa.

From the American Institute of Architects:
George B. Post, past president, 33 East Seventeenth street, New York.
William S. Eames, past president, Lincoln Trust Building, St. Louis, Mo.

From the National Brick Manufacturers' Association:
John W. Sibley, treasurer, Sibley-Menge Press Brick Company, Birmingham, Ala.
Wm. D. Gates, American Terra Cotta & Ceramic Company, Chicago, Ill.

From the National Fire Protective Association:
O. U. Crosby, chairman Executive Committee, 76 William street, New York.

From the National Lumber Manufacturers' Association:
Nelson W. McLeod, president, Equitable Building, St. Louis, Mo.
John L. Kaul, president, Southern Lumber Manufacturers' Association, Birmingham, Ala.

From the Corps of Engineers, U. S. Army:
Lieut.-Col. Wm. L. Marshall, Army Building, New York.

From the Isthmian Canal Commission:
Lieut.-Col. O. H. Ernst, Washington, D. C.

From the Bureau of Yards and Docks, U. S. Navy:
Frank T. Chambers, civil engineer, Washington, D. C.

From the Supervising Architect's Office, U. S. Treasury Department:
James K. Taylor, Supervising Architect, Washington, D. C.

From the Reclamation Service, U. S. Interior Department:
F. H. Newell, chief engineer, Washington, D. C.

From the American Railway Engineering and Maintenance of Way Association:
H. G. Kelley, president, Minneapolis, Minn.
Julius Kruttschnitt, director of maintenance and operation, Union Pacific Railroad, 135 Adams street, Chicago, Ill.
Hunter McDonald, past president, chief engineer, Nashville, Chattanooga & St. Louis Railway, Nashville, Tenn.

From the American Railway Master Mechanics' Association:
J. F. Deems, general superintendent of motive power, New York Central lines, New York.
A. W. Gibbs, general superintendent of motive power, Pennsylvania Railroad, Altoona, Pa.

From the American Foundrymen's Association:
Richard Moldenke, secretary, Watchtung, N. J.

From the Association of American Portland Cement Manufacturers:
John B. Lober, president, Land Title Building, Philadelphia, Pa.

From the Geological Society of America:
Samuel Calvin, professor of geology, University of Iowa, Iowa City, Iowa.
I. C. White, State Geologist, Morgantown, W. Va.

From the Iron and Steel Institute:
Julian Kennedy, metallurgical engineer, Pittsburgh, Pa.
C. S. Robinson, general manager, Colorado Fuel & Iron Company, Denver, Col.

From the National Association of Cement Users:
Richard L. Humphrey, president, St. Louis, Mo.

From the National Board of Fire Underwriters:
Chas. A. Hexamer, chairman Board of Consulting Experts, Bullitt Building, Philadelphia, Pa.

◆◆◆

Concrete piles of an unusual form have recently been tested in New York City. They are made by spreading a layer of concrete on wire fabric to which longitudinal rods are attached at intervals. The fabric is immediately rolled up in a special machine of simple construction and the pile then laid aside to harden. It thus contains in addition to the fabric any desired number of vertical rods. In a cross section of the pile the fabric lies spirally from the inside to the exterior of the concrete. If so desired any one of the rods may be made a hollow tube, thus allowing for the use of the water jet process for sinking the pile.

CORRESPONDENCE.

Foundations for Frame Buildings.

From Calvin Gray.—As being of possible interest to "B. C. M.," whose inquiry about light foundations appeared not so very long ago in an issue of *Carpentry and Building*, I inclose sketches showing two methods of doing the work. In Fig. 1 is shown a cottage foundation constructed solely of cedar pieces resting on concrete footings. Care should be taken to have sound red cedar stubs tapering upward, as these permit the ground to raise by frost with but little tendency to lift the post. Cut the top end straight at one side to receive the base projecting below the sill. Large holes should be dug and a good footing of rock, spawls, gravel, sand and cement concrete tamped in and allowed to set. At the point where the post comes in a piece of board as large as the end of the post should be tamped down level to make a good base on which the post should set. These boards should be removed when the posts are set. The lengths of the posts should be taken and the posts cut square at top and bottom, making sure that the ends are in parallel planes. The posts can then be set by line and filled and rammed in the usual way.

In Fig. 2 is a plan and elevation of a very substantial kind of foundation for frame dwellings. It can be made with rock concrete or with combination of rock footing and cinder body above the bottom of the posts or of cinder concrete, according to the size and body of the structure. Cedar anchors 4 x 4, 4 x 6 or 6 x 6 are imbedded in the concrete, as shown in the sketches. The posts are usually notched in the sides to help hold them firm. This type of foundation is good in any locality and especially desirable where high winds are frequent. In the cyclone belts people who have had experience insist upon every reasonable measure being taken to keep the house on the foundation, yet nothing will stand a well developed cyclone. The writer, however, has seen a whirlwind stand a frame dwelling up on one corner and let it fall back crosswise the foundation, while another, anchored as shown in Fig. 2 and within 50 feet of the first one, was not disturbed.

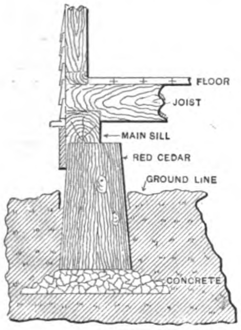


Fig. 1.—Cedar Stubs on Concrete Footings.

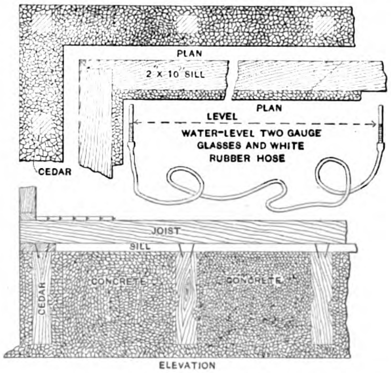


Fig. 2.—Plan and Elevation of Concrete Foundations with Cedar Anchors Imbedded therein; Also Elevation of a Water Level.

Foundations for Frame Buildings.

The simplest way to level foundations is, I think, with a length of wide rubber hose into which are stuck two ordinary gauge glasses. These almost filled with water and calked should be all any one needs to establish the level of any point in ordinary foundations.

Sizes of Sash and Sash Rails.

From W. E. S., *St. Anns, Canada.*—I notice that "Old Reader," Evanston, Wyo., asks in the March issue regarding the different sizes of sash and sash rails used in various localities. I would say that it is the custom in my locality to make sash stiles 2½ inches wide by 1⅝ inches thick, and the rails of the same thickness by 1 15-16 inches in width for check rail sash rabbeted together or beveled. The sills are 3 inches wide for glass that is 24 inches long and under and 3½ inches wide for glass 36 inches long. I would be pleased to hear from other localities in reference to sizes of sash and sash rails, and would like to know if there is any rule for determining the width of sills. Will some of the readers inform me what other way there is for joining sash rails together besides beveling and rabbeting?

From A. B. S., *Sardis, Ohio.*—Regarding the inquiry of "Old Reader" relative to size of sash and sash rails I beg to say that we largely use what is called "Ohio sash," which has 3½-inch bottom rail, 2½-inch side and top rails, 1⅞-inch check rails and ¾-inch muntin, which would make the frame for a two-light 24 x 30 inch glass window 28½ inches wide by 66 inches high. We sometimes get Western sash which is ⅜-inch narrower, but of the same hight. I would suggest to correspondents interested that it would be best to secure a catalogue from the mill men, which would give the size of sash that they use.

From A. C. S., *Winchester, Ohio.*—In reply to "Old Reader," who wants to know the sizes of sash used, would say that in this locality the "Western size" has been in vogue until quite recently when the "Eastern size" was placed on our market. The "Eastern size" is ½-inch larger than the "Western size" and is worked from 2½-inch stock, rabbeted ¼ inch for glass, leaving 4½ inches of wood over glass measure in width and 6½ inches in length, whereas the "Western size" is worked from 2¼-inch stock, leaving 4 inches of wood in width and 6 inches in length.

Shingling Hatchet Attachment.

From Young Builder, *Monona, Iowa.*—Please tell me where I can get a shingling hatchet attachment such as described by "Western Builder" in the February issue of the paper. I can neither get it made here nor can I buy it.

Answer.—We submitted the above inquiry to the correspondent in question, who in reply states he is unable to give any information on this point, as the spring gauge he has was purchased some years ago and he has been unable to find it on the market or listed in any tool catalogue since. He expresses the opinion that one could be made by any good machinist or novelty shop.

Rapid Methods of Shingling.

From J. W. W., *Bladen, Neb.*—In the light of the discussion in progress I may say I have paid in Los Angeles, Cal., 50 cents and 60 cents per 1000 for shingling. There are lots of men with that little three-cor-

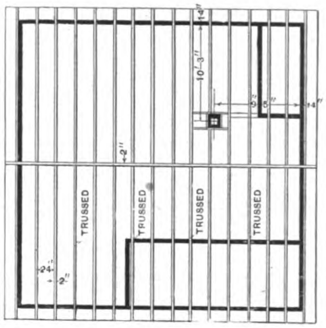
nered box and hatchet who can lay 10,000 shingles in eight hours. They use three-fine nails, but for me I do not call it work. I have 48,000 to lay now and expect to lay 2500 a day. I do not want the big men on my job.

From WESTERN BUILDER.—In my communication concerning rapid methods of shingling the types made me say that "the head of the hatchet should be placed against the last course of shingles, the lug or stop on the gauge forming an automatic guide for the new course." This is obviously incorrect, the reverse being true. The projecting lug, pin or whatever may be used for a gauge should stop against the course of shingles last laid, the head of the hatchet being used to stop the shingles of the new course. Reference to the illustrations accompanying my communication in the February issue will make this sufficiently clear, I think.

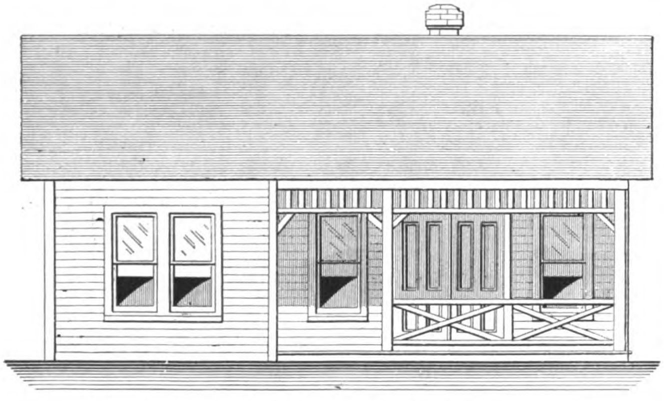
Allow me to extend my fraternal thanks to Mr. Odell for his "defense" in the February number. I am very sure that if more of our fellow chips would try some of these simple appliances for aiding in rapid work they would find them profitable.

Design for a Summer Cottage.

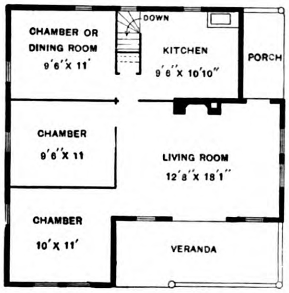
From C. A. WAGNER, *Port Jervis, N. Y.*—I am sending with this letter blue prints showing a small summer home suitable for erection near the banks of a river, pond, lake or any other body of water, or it may be utilized simply as a summer cottage suitable for almost any locality. From the very nature of things it is to be cheaply constructed, as it is intended to be inhabited only a portion of the year, more particularly during the summer months. The drawings show not only the interior arrangement of the house, but also indicate the general construction employed.



Timber Plan of Roof.



Front Elevation.—Scale, ⅛ Inch to the Foot.



Main Floor.
Scale, 1-16 Inch to the Foot.

Design for a Summer Cottage.—C. A. Wagner, Architect, Port Jervis, N. Y.

I might mention for the information of the readers that the ground plan of the house outside to outside is 30 feet square, and that the veranda is 18 feet in length. The partitions dividing the several rooms of the house are of 1-inch material and the outside walls are 5 inches in thickness.

Finding Lengths of Rafters by Bridge Measurement.

From J. T., *Trenton, N. J.*—I have read with great interest the article by Morris Williams of Scranton, on page 250 of the volume for last year, regarding the method of finding the lengths of rafters by bridge measurement. I have a hip roof to frame shortly and would like to try the same method, but I do not understand how to work out the fractional part of a foot in the run of the rafter, as, for example, the half width of my building is 15 feet 4½ inches and the rise is 7⅝ inches to 12 inches, making the diagonal exactly 14¼ inches. I, however, cannot seem to get the correct length either of the common rafter or of the hip, which has a square seat. Shall I use the diagonal of 7⅝ inches and 12 inches or 7⅝ and 17 inches for the hip?

There is also a small ventilator on the main roof, the half of it being 2 feet 1 inch and the rise 7⅝ inches to 12 inches, making the diagonal 14¼ inches, the same as the main roof. Now 14¼ inches multiplied by the run 2 feet 1 inch is exactly 2 feet 5 11-16 inches, but I cannot get it correctly by the figures. I would like to have Morris Williams or some of the other readers of the paper straighten me out on this matter.

Some Questions in Hollow Block Construction.

From W. L. P., *Occidental, Cal.*—Three years ago, while I was in the hospital, with both legs broken, some of my friends gave me a copy of *Carpentry and Building*, and ever since then I have had the paper every month, and think it the best of its kind. I would like to ask through the correspondence department some questions in regard to hollow block buildings, as I have a job to put up a store building, 32 x 75 feet in size and two stories in hight. What do the practical readers think of the idea of plastering directly onto the blocks on the inside, the blocks to be made with a Pettyjohn machine, standard size, which is an 8-inch wall? Is it better to use lath or will the blocks keep out the moisture? If lath are to be used, how should they be put on?

How heavy is it necessary to have the I-beams to carry an 8-inch wall, 12 feet high and 32 feet span? I want the beam to extend across the front of the building over the first floor, which is to be used for store purposes.

Attachment for Wood Turning Lathe.

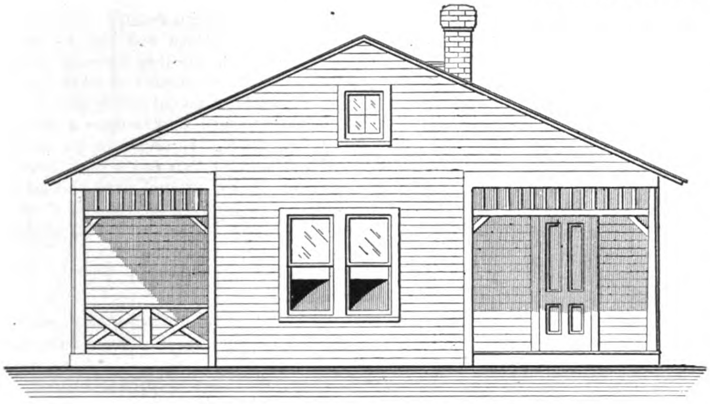
From J. F. W., *Danville, Pa.*—Will some of the many readers of *Carpentry and Building* furnish for publication a design showing how to construct a lathe head and carriage for a wood turning lathe with 12-inch swing? I want something that will turn out axe handles, hatchet handles, wheel spokes, etc., and I am of the opinion that

such a carriage could be constructed for a plain wood turning lathe. There are of course automatic gauge lathes made, but these are too dear for a poor man to buy; besides the other would answer better where one has much turning to do.

The Shingling Question Again.

From P. C. D., *Fryeburg, Maine.* — This shingling question still keeps to the front, so I will add my mite. I think it is of more importance to have a good roof when finished than to be able to say one has laid 10,000 shingles in a day, but of course there is a great difference between laying 6 or 8 inch dimension shingles and laying shingles that run from 1½ to 8 inches in width, with a large part of them 2 and 3 inches, as they do in this part of the country. Our average carpenter will not lay over six or eight bunches a day and do a good job working alone and with a line. I have, however, known two men working together with a straight edge— one laying and the other nailing—to slap on 15,000 in a day, but it was a slap it up job.

In the West, where they lath their roofs or leave 2 or 3 inch cracks between the boarding, they have something to hold the shingles above them on the roof; and that three-cornered perch may do, but in this part of the country we board the roof tight and have a stage on which to work and keep our shingles. "Western Builder" says his three-cornered perch is not detrimental to the roof, but it would not go here. Builders would not have the shingles punched full of holes, as they must be when using that contrivance. Now to bring the discussion to a close I will make the suggestion that the shingling question be eliminated from the carpenter's work altogether by turning it over to the shinglers at so much per 1000 or a square, the same as lathing is done. I am sure that not many carpenters will be sorry to have this disposition of the case.



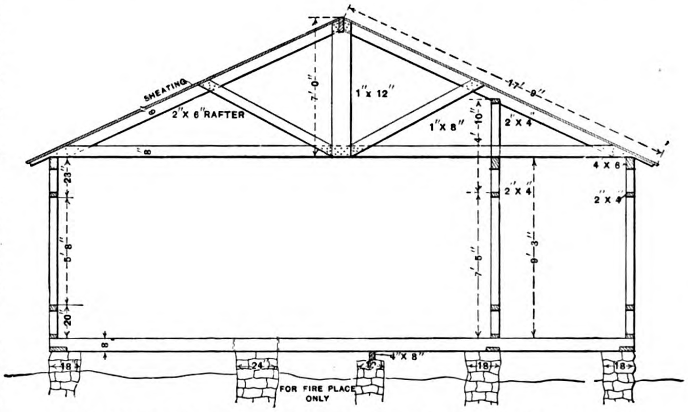
Side (Right) Elevation.—Scale, ⅛ Inch to the Foot.

Cause of Creosote in Chimneys.

From W. L. P., *Occidental, Cal.*—I find in the January number of the paper a question from a correspondent relative to the best method of preventing creosote running down chimneys, and, as we have a great deal of trouble out here from the same cause where we burn redwood, I would like to give the readers the benefit of my experience. I find that whenever the draft is stopped the trouble begins, and to overcome it I open the draft in the chimney when the stove draft is closed. The increased circulation through the flue seems to obviate the difficulty. I wish "A. D. C.," Johnsville, N. Y., would try this plan, for if he does I think he will have no further trouble.

Short Cuts in Framing.

From C. C. H., *Brookville, Pa.*—I am right in line with "Old Beginner," Rochester, N. Y., and "J. T. D.," Dallas, Texas, as set forth in one of the issues for last year. A large percentage of the sketches with numerous reference letters and figures shown in the pages of the paper are to me like so much Greek. Take, for example, the serial articles by Mr. Fox on "Circular Arches in Circular Walls," as well as some of the star sketches that take up an entire page, with lines and reference letters by the dozen. This is all right for those who have had good schooling and a good education, but to me, who had to leave school when 12 years old and turn out to help earn the bread and butter, they are too much to master. What we want are such simple ways and methods as those shown by Frank G. Odell in the November number for last year, illustrating how to find the side cuts of jack rafters. I would like to ask him if he will tell us how to work out the side cuts for hip and valley rafters to fit up against a ridge board? I think it would be a great help to a large number of readers if some of the Brother Chips who are good at roof framing would give a table showing just how much to set the gauge to back hip rafters—that is, it will be a quick way for any one to gauge a hip rafter for the backing on top. Of course, this table should be for rafters 2 inches thick and we would gauge a center line on top. Now, how much must we go down on the side of the rafter for the different pitches, from ¼ up to 2-3? It would also be interesting to have a table of the side cuts for hips and valleys against ridge boards, as this would relieve one's mind of so many bridge measurements.



Sectional View Showing Truss Construction.—Scale, ⅛ Inch to the Foot.

Design for a Summer Cottage.

Again, it would be very useful if some of the Brother Chips who have had experience would tell how to read blue prints and plans. Do the measurements given mean the distance between rough walls or between the finished plastering in the case of both frame and brick houses? I believe a little explanation on this subject would benefit many readers, more especially if done in plain every day language.

I am well pleased with the subject of "Laying and Finishing Hardwood Floors" by Mr. Odell, and trust the good work may go on.

Note.—Our correspondent raises a number of ques-

tions which afford basis for interesting discussion on the part of practical readers. It may not, however, be out of place to mention that in making up the pages of *Carpentry and Building* it is the endeavor to meet so far as possible the requirements of all classes of readers, and it is therefore necessary to publish articles which appeal to those who are advanced in the art and science of carpentry as well as matter that is quite elementary and calculated to prove of assistance to those young in the business.

With regard to reading plans, it might be stated that this is largely a matter of experience and practice. The measurements given in connection with plans as furnished by architects sometimes show the distance from center to center of walls and other times the figures indicate the size of the finished room. In the case of the plans published in these columns the measurements are those of the inside of the room measured from plastered wall to plastered wall. Our correspondent will doubtless be interested in some of the articles which appeared a few years ago in these columns on "Reading Architects' Drawings," and which have since been published in pamphlet form, copies being available through this office at 25 cents each.

Roof Plans for House of "A. S. W."

From L. K., *Cragsmoor, N. Y.*—Although somewhat young in years and not having had the experience of some in the business I take the opportunity of sending drawings showing two roof plans in answer to the inquiry of "A. S. W.," which appeared in the March issue of the paper. The plans so clearly speak for themselves that no detailed explanation is needed and I submit them in the hope that they will be of assistance to the correspondent in question. If he should desire a lower roof I would suggest a deck as indicated by the dotted lines in Fig. 1, although Fig. 2 represents the simpler solution of the problem.

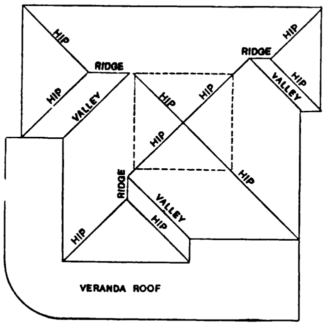


Fig. 1.—One Solution of the Problem.

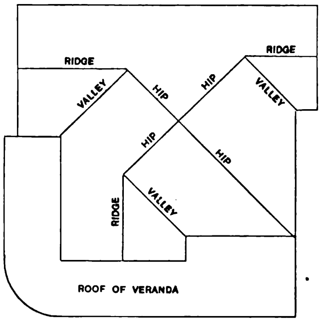


Fig. 2.—A Simpler Method.

Roof Plans for House of "A. S. W.," Submitted by "L. K."

Note.—We also have plans similar to Fig. 1 from "J. F. J.," Nokomis, Ill., and "Subscriber," Mt. Vernon, Ohio. We have plans similar to Fig. 2 above from "G. D.," Shippensburg, Pa.; "O. N.," Atkinson, Ill., and "A. S. H.," Danbury, Conn.

From A. B. S., *Sardis, Ohio.*—I send herewith an outline for the roof of the plan presented by "A. S. W.," Belmont, W. Va., in the March issue of the paper. The drawing represents a hip roof, but if the correspondent desires to use the attic he can put gables on the three small hips or use dormers, so as to give light where it is needed. I do not send this drawing as representing the only way of roofing the house, but it is the plan I should use if I had the job, and if required I would make the changes suggested. If I have been of any use to the readers of *Carpentry and Building* I will try again some other time.

Note.—We have not engraved the sketch of our correspondent as it is similar to the Fig. 1 of "L. K." published herewith.

Details of Stair Construction Wanted.

From R. E. B., *Clarksville, Tenn.*—Will some of the stairmen among the readers of the paper furnish details as to the building of stairways, such, for example, as the thickness of wall strings, how finished against upper and lower hall bases? Do they dovetail the balusters where they go around the well hole? Is it common practice to build the stairs before the house is plastered? You see we all may have different methods of doing work of this kind and an exchange of ideas may prove helpful along these lines.

A Plea for the Average Carpenter.

From P. A. S., *Fort Missoula, Mont.*—In renewing my subscription to *Carpentry and Building* for another year I desire to say that every month I read all there is in it from the first word to the last, not to mention the insides, as a butcher would say. I am greatly interested in those 8000 and 10,000 shingle men and the 10 and 12 door a day men, but it seems to me they have an idea that if a carpenter cannot do that amount of work in a day he is no workman. Now I am no carpenter and perhaps have no right to criticise, but I have done a little shingling and hung a few doors. It seems to me that a carpenter is a man who can do a fair day's work from the time the lumber comes on the ground until the last hammer stroke is given, and I would like to ask if those men who do such wonders can work as fast at all kinds of carpentry as they do in connection with doors and shingles. It is certainly an interesting subject to me.

There are many short cuts in carpentry and quick methods of doing work, such as that shingling stool and the gauge and pin on a hatchet, all of which is good for every carpenter to know. All carpenters, however, are not built with the ability to do such an amount in eight or ten hours, yet at the same time they are good mechanics. All men like to live, so it is not right to bar out a man because he is a little slower than another, and besides would the few fast men do all of the carpentering needed to be done in this strenuous country of ours?

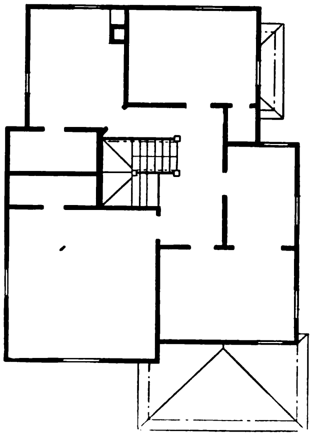
Obtaining Cuts and Bevels of Rafters.

From A CONSTANT READER, *Mt. Vernon, N. Y.*—I would like to ask "L. H. H.," through the Correspondence Department of the paper, how he obtained the base cut 17 of the principal rafter and the 12 and 15 by which to find the bevel cuts for the jacks. I refer to his sketches and letter in the January number of the paper.

Relative Cost of Stone and Concrete Cellar Walls.

From E. N. C., *St. Louis, Mo.*—In reply to "G. G.," Great Barrington, Mass., relative to the cost of stone and concrete cellar walls I would say that for building rubble stone and concrete walls here in St. Louis, with Portland cement at less than $2.00 a barrel, the cost is the same for both. We give the owner the choice of whichever foundation he desires. The concrete is mixed one part cement, three parts sand and five parts crushed

rock. The stone wall is laid in lime mortar. This is for 18-inch walls, but for thinner walls the concrete is a trifle cheaper. The concrete walls are often not as water proof as stone walls but can be made so by plastering them on the outside with rich cement mortar. In my estimation the cheapest form of foundation wall construction is of hollow blocks, provided the blocks are made with 10 per cent. of water and faced with a rich mixture.



Roof Plan Wanted for Two-Story Dwelling.

Weather Boarding a Bay Window.

From S. M. T., *Winfield, Pa.*—I have been a reader of *Carpentry and Building* for several years and have derived much benefit from a perusal of its columns. I now come to ask through its pages how to weatherboard a bay window with 3½-inch lap siding when the bay window has a radius of 6 or 8 feet.

Hanging Doors in Canada.

From Toiler, *Toronto, Can.*—Occasionally we hear of individual mechanics skilled in some particular line of our craft performing incredible feats of speed, but what we should look to as desirable men to employ are those who neglect no opportunity to improve themselves in each and every branch, from the putting on of the sills through all the different phases of construction to the completion of the structure. Accuracy in the construction of our best and most desirable buildings will lead to recognition by our employers much sooner than speed and uncertainty.

I think it should be the ambition of every beginner to qualify himself as soon as possible to accurately understand, correctly lay out and complete any piece of work with which he may come in contact, and then he will be in a position to command better pay than the speedy man, while at the same time his services will be more sought after. However, as we are in want of men to fill every line, a good general all round workman is the real backbone of the business.

Now as to the amount of work he can do, a great deal depends upon the condition in which he finds the work when he reaches it. Suppose he is fitting and hanging doors. If the side jambs are plumb and the head level, all set true and straight, a good mechanic should be able to fit and hang with two butts each 12 to 14 doors in eight hours, the doors being pine 1⅜ inches thick, and from 2 feet 4 x 6 feet 4 to 2 feet 8 x 6 feet 8.

The method of hanging doors varies greatly with the men employed to do the work. A few suggestions as to the method of doing the work in this section of the country may not be without interest to some of the readers in the States. After fitting the door with the desired amount of clearance we try it in the opening, which need be only once if straight edge and square are used, and then mark carefully the position of the hinges for both door and jamb; remove the door; gauge up with butt gauge (Stanley's is good); fit the hinges in the door and jamb, and if the whole thing is carefully done the job is completed. The locks on our good work are not usually placed until the painting is about completed. In marking for the hinges we, of course, only mark for one side of the hinge, usually the top of the top hinge, 7 inches below the top of the door, and the bottom of the bottom hinge 10 inches above the floor. Then by always working toward the center no mistakes are made.

I find that by using great care until we become proficient speed will follow because of the fact of there being no false moves.

Roof Plan Wanted for Two-Story Dwelling.

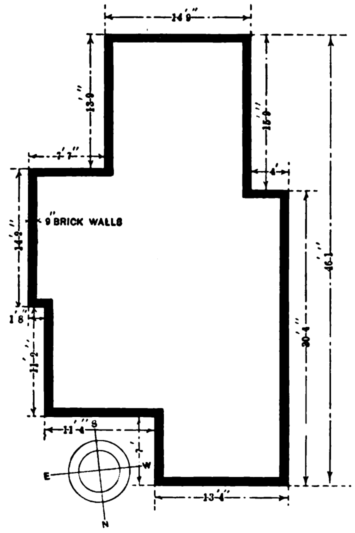
From C. K. S., *Wayland, Iowa.*—Inclosed I send a tracing of a second floor plan of a house which is to be remodeled. I would like very much indeed to have some of my brothers in the craft submit for publication roof plans suitable for the building.

Roof Plan or Elevation Wanted.

From J. C. L., *Hammond, Ind.*—I send the outline of a building and would be glad to have some of the readers of *Carpentry and Building* give me their ideas as to the proper roof plan or elevation. I might state that the roof will be on a level all around the building, and hips preferred in place of gables wherever possible. The roof is to have one-half pitch and the cornice is to project about 12 or 14 inches. The building is of brick, with walls 9 inches in thickness. Any assistance granted this request will be thankfully received by one of the old-time readers of *Carpentry and Building.*

Question in Plank Frame Barn Construction.

From V. B., *Smithville, Ont.*—I have read with much interest the copy of the little book, entitled "Plank Frame Barn Construction," and desire to ask a question in regard to work of this kind. In a barn built of solid timber I notice the end purlin posts have sprung when the barn was filled with hay and grain. The posts were 10 x 10 x 32 hard maple and elm. They ran perpendicular from sill to plate, with no support to the posts between sill and plate. If instead of a purlin post there were two planks, one a few feet in from the end with brace and bolts, what size timber or plank would be required and what would be the method of construction?



Plan Submitted by "J. C. L."

WHAT BUILDERS ARE DOING.

THE amount of work in progress is unusual for this season of the year, and prospects regarding the future continue of a most glowing character. Here and there the volume of operations show a slight falling off, as compared with a year ago and some hesitancy is shown in certain quarters growing out of the uncertainties of the labor situation on the first of May. Taking the country over, however, the gain in the amount of building improvements projected during the month of February is very marked and there is every indication of an active season in this important branch of industry.

Erie, Pa.

Members of the Builders' Exchange cast their ballots on February 6 for directors for the ensuing year, resulting in the following choice: Cassius McCreary, B. W. Schaffer, Charles H. Schaper, A. S. Weber, F. C. Richardson, John N. Sapper, Oscar Nick, George B. McIntyre, Lyman Felheim, Fred Goodhill, W. D. Sweigart, A. Schroeck, J. D. Johnson, Peter J. Zissinger and James B. Yard.

The Board of Directors organized on February 8 by electing C. McCreary president; F. C. Richardson, vice-president; W. D. Sweigart, secretary; John N. Sapper, treasurer, and R. F. Washburn, assistant secretary.

After the business meeting had been completed the members and invited guests went in a body to the Moon Cafe, where the fifth annual banquet was held. An elaborate menu had been prepared, and after it had been properly considered cigars were lighted, and Mayor R. J. Saltsman, acting as toastmaster, made a few appropriate remarks, introducing President-elect McCreary. The other new officials also spoke, briefly thanking the members for the honors conferred upon them, after which there was an address by Judge F. A. Walling.

The address of the evening was that of Edward A. Roberts, secretary of the Builders' Exchange of Cleveland, and also of the Ohio State Association of Builders' Exchanges. The requisites for success were outlined by the speaker in a way to command close attention, and he also briefly presented his plans and specifications for an ideal Builders' Association. His first requisite for success was an efficient corps of officers; his second was loyal members, and his third was to contribute liberally to the support of the association. If, he stated, the builders of this country would solve the problem that confronts them they will be jealous of their organizations and do all in their power to uphold them. Through local State associations, and these by intercourse with each other, lies the only hope of solution. In concluding his remarks the speaker expressed the belief that the Builders' Exchanges of the country have demonstrated their usefulness by years of successful existence. They should be regarded as valuable aids to business, but cannot be expected to take the place of individual effort, enterprise or genius. Rather do they serve as a medium through which these forces may the more easily and successfully operate. As organizations they are, or should be, bulwarks of strength to the builder, elevating his calling, upholding his rights, protecting his principles and interests, worthy and indispensable agents for his good and welfare.

Holyoke, Mass.

The members of the Master Builders' Association with a number of their friends held their first annual banquet in the Hotel Hamilton, February 22. Representatives were present from Northampton, Springfield, North Adams, Westfield, Chicopee and other towns. Preceding the banquet a brief reception was held, at which there was an interchange of goodfellowship and discussion of building prospects for the coming season. At the hour appointed the guests assembled in the banquet hall, covers having been laid for about 175. After an elaborate menu had been considered President A. M. Cain extended a cordial welcome to those present, and in a few clever remarks introduced Edward Hart as toastmaster. The next speaker was Mayor N. P. Avery, who was followed by H. C. Wood, State president of the Master Builders' Association, and E. B. Emerson of Northampton.

The Reception Committee in charge of the affair consisted of John F. Shea, chairman; Joseph La Liberte, F. H. Dibble, L. T. Beaulieu, L. P. Trowbridge, F. F. O'Neill, Thomas J. Carmody, Thomas J. Gibson, A. M. Cain, J. Cuthbertson and G. L. Thorpe of Holyoke; M. C. Bailey and J. C. Whiting of Northampton; T. B. Gilbert and V. E. Russell of Springfield; H. C. Wood of North Adams, and T. J. Mahoney of Westfield.

The Banquet Committee was made up of Edward Hart, chairman; John F. Shea, Joseph La Liberte, Charles L. Thorpe and F. J. Curley, the latter being the secretary-treasurer.

Los Angeles, Cal.

During the month of February the total value of the building permits issued in Los Angeles was $1,082,875. This included 765 permits, and was greater both in aggregate value and number of permits than any other February in the history of the city.

The feature of the building situation at present is the great increase of residence building as compared with business building. During February only 18 business structures were started, while about 600 residences were begun. The average cost of two-story residences for the month was $3884 and one-story cottages $931. Builders report the outlook for the spring and summer as good. A good deal of important work is now in the hands of the architects, although it is not expected that the present summer will equal last summer in the amount of large buildings constructed. At present all the building trades are busy, and while workmen are not scarce practically all of them are employed.

New York City.

The favorable weather which has prevailed during the past winter has been reflected in an unusual amount of building operations for this season, and the work projected has been considerably in excess of that for the corresponding period of last year. This applies more particularly to the boroughs of Manhattan and Brooklyn, as in the Borough of the Bronx there has been a slight falling off as compared with the tremendous activity which existed a year ago in this particular section of Greater New York. Up to the time of going to press the value of the building improvements for which permits were issued in the Borough of Manhattan since the first of the year was in round numbers $24,500,000, as against $15,500,000 in the same period a year ago. In Brooklyn the figures stand $7,600,000, as against $7,000,000, and in the Borough of the Bronx, $3,900,000, as compared with $5,400,000 in the first two months of 1905.

In the labor world minor differences still continue to exist in certain branches of the trade, although the trouble has not assumed such proportions as to seriously interfere with building operations or jeopardize the bright prospects for the future which now exist.

A section of Brooklyn which has heretofore been neglected in the general building activity of the borough is to receive marked attention in the next few months. Negotiations have been concluded whereby 800 houses are to be erected at Woodhaven. Ten four-story houses are to be erected at Sterling place and Washington avenue, and work has been commenced on 25 houses on Bedford avenue and Chauncey street, and on 13 dwellings on Hull street and Stone avenue. The operations are being conducted by the Edgar Improvement Company.

Philadelphia, Pa.

The month of February broke all previous records, the statistics of the Bureau of Building Inspection showing permits to have been issued to the number of 545 for 1271 operations, calling for a total estimated cost of $3,063,720, which exceeds the previously highest February (that of the year 1903) by over $1,280,066; and exceeds that of January by almost identical figures, the amount being $1,280,100. The statistics for January and February show a total of 1074 permits for 2309 operations, estimated to cost $4,802,040. By far the largest proportion of the new work during February has been in dwellings of the two and three story type, the costs of which are estimated at $1,615,300 and $475,000, respectively. A large amount of this work was what is known as big operations and covered blocks of 25, 50 and 100, and even more houses in an individual operation.

The weather was favorable and such as to enable builders to push outside work steadily ahead and work started during the winter months is generally much further advanced than is the custom at this season. The outlook for the year is considered most favorable. Work is being offered freely; labor is in good demand and appears to be satisfied, generally speaking, with existing conditions. In some instances skilled labor is scarce and additional good mechanics hard to get.

Prominent among the building operations which will soon be commenced may be mentioned that of John Megraw, who will erect 61 two-story brick dwellings each 15 x 47 feet and involving an outlay of something over $101,000. The buildings will be located on Wilton and Fifty-second streets and were designed by J. E. Jackson. Samuel H. Brown is to construct 64 two-story stone and brick houses, each 15 x 42 feet, on Thayer and on Ontario streets, involving a cost of over $102,000.

Pittsburgh, Pa.

The month of February has shown something of a halt in the matter of building operations as compared with the same month last year, the value of the improvements being

$347,281, as against $389,317 in February, 1905. The carpenters of the Allegheny district have notified the Master Builders' Association that they would demand an increase in wages of 50 cents per day, beginning May 1. It seems to be the general opinion that this increase will be granted provided the carpenters agree to have their wage scale terminate on the last day of each year the same as other labor organizations.

Among the latest building projects in the city is a 14-story structure to cost about $1,000,000, which is intended to be used for storage and light manufacturing purposes and to furnish a home for the Pittsburgh natatorium. The site has a frontage of 120 feet in Duquesne Way and a depth of 110 feet. The new building will be put up on the front of the site where now stands the natatorium, and it will probably extend back about 80 feet. The improvement will be made by Henry Phipps, and the structure in the external design will be similar to other large buildings in that section of the city put up by the same capitalist, while constructively it will be of enormous strength.

The natatorium building, to be provided by Mr. Phipps in the rear, will be equal, it is stated, to any structure of its kind in the country. It will be three stories high, and special natatorium architects have been engaged to travel over the country and embody in this proposed building the very best ideas they can gather from the structures visited. One of the main feaures will be a series of Turkish baths. There will also be a swimming pool, shower, plunge and needle baths, and on the first floor a fine suite of offices. The present natatorium in Duquesne Way is to be razed in order to make room for the new building.

Portland, Ore.

The past winter has been the most active winter building season in the history of Portland. Building has, in fact, been almost without interruption ever since the close of the fair, and with the opening of the spring there has been a naturally and large increase. The greatest interest is centered in the 12-story Wells, Fargo & Co.'s building, which is now under way. On this structure the basement work has been completed and the superstructure is now going up. This building will require 80 carloads of steel. Several other large buildings are under way, and others are to be commenced in the early summer. Contractors report that apartment houses and flats seem to be meeting with greater favor, and they are counting on a large increase in this class of building during the present year. New apartment houses and a number of costly structures are planned, the most extensive being the seven-story Gunst Building at the corner of Eleventh and Washington streets, which will cost $2,000,000. Residence building is expected to run slightly ahead of last year, although active residence building is not expected to begin as early this year as last, when it was stimulated by the advent of the Lewis and Clark Exposition. So far, however, the weather has been favorable, and architects report that residence building will begin actively this month.

Rochester, N. Y.

The report of James H. Severance of the Fire Marshal's office shows that more building permits were issued in February than in any previous February in the history of the city; also that the aggregate for January and February of this year is greater than ever before. This, of course, is most promising for an active season's business in the building line. During February this year there were 104 permits issued for buildings, estimated to cost $249,950, as against 50 permits, estimated to cost $104,100, in February last year. The total cost of buildings for the first two months this year is $385,942, as compared with $185,925 for the same period last year; $367,185 for the first two months of 1904 and $146,903 for the same period in 1903. In the report for February there is not a single application for a new business building or manufacturing plant, which is also true for January. There were a few permits issued for remodeling large buildings or for minor alterations, but all others were for dwelling houses. The most costly residence for which a permit has thus far been issued this year is that to be erected by G. D. B. Bonbright, which is estimated to cost something over $23,000. Considering the fact that there are no large manufacturing plants or commercial buildings covered in the report Fire Marshal Walter considers February a big month.

San Francisco, Cal.

The expected improvement in the building situation has commenced, although the rains have been prolonged, and the February fall was very heavy in San Francisco and vicinity. The plans for a number of large business structures have been announced, besides a fair proportion of residences, apartment houses and school buildings. If three-fourths of the work now being figured on in the architects' offices is carried to completion this will be one of the best building years in the city's history. During the month of February 389 building permits were issued, amounting to $1,643,753 in cost. The brick buildings proposed are estimated to cost $871,319.

There seems to be no limit to the construction of new theatres in the city, although there is still lack of an opera house of metropolitan pretensions. A plan for such a building adjoining Union Square has been discussed, but nothing has yet materialized. The latest theater planned is a fireproof building, costing $125,000, which will be erected by the Washington Square Theater Company, just incorporated by Gottlob and Marx, with an auditorium seating 1600 persons. The new building will occupy the present site of the Græco-Russian Cathedral, which will be torn down.

Building materials are in better supply than at the first of the year, but there is still less cement and lumber in stock than will be needed when building operations are fully under way. It is more than possible that there will be a serious shortage again, although dealers claim that they will be able to secure enough for all future demands. Fir lumber has been advanced $1 a thousand by the wholesalers and lumber prices are firm all along the line.

There is a good supply of brick at reasonable prices. Plenty of labor is to be had for the present demands of the building trade.

The Law Brothers, the new owners of the Fairmont Hotel, propose to add at least 600 rooms to the six-story building, either by another story or by covering more of the block, which is 275 x 412 feet. It is also proposed to build a Greek theater on the sloping grounds in front of the main building, which has already cost over $2,000,000. A stone auditorium, seating over 4,000 persons, will be built on the steep terrace in front.

Plans have been accepted at Berkeley, Cal., for the new Bancroft Way schoolhouse, which is estimated to cost $50,000. The Piedmont Avenue schoolhouse is in course of construction, at a cost of $30,000.

The Board of Supervisors are about to take action on an ordinace creating a municipal building bureau, wherein all public buildings will be planned and under the supervision of which they will be erected. It provides for the appointment of a consulting architect and a general supervising architect. Some of the local architects have made objections to some of the changes which were made in the original draft of the ordinance. Under the amended form the architect whose plans for a building are accepted immediately becomes consulting architect for the work and receives 3 per cent. of the cost of the building where it amounts to $100,000 or less, and the general supervising architect receives 2 per cent. of the cost. When a building costs over $100,000 the consulting and the general supervising architect will each receive 2½ per cent. of the total cost. One of the complaints is that many architects will not care to seek this public work when the remuneration is only about one-half of the commission they get for general work. A very large amount of money to be secured from the sale of bonds is available for the construction of public buildings.

The annual banquet of the Builders' Exchange was held on the evening of February 24 in the white and gold room of the Hotel St. Francis and was attended by nearly 200 members and invited guests. The programme was of a most entertaining nature and the menu was thoroughly in keeping with an occasion of this kind. The menu card was, as on previous occasions, one of the amusing features of the banquet. Various builders were ludicrously pictured in the pursuit of their various daily activities, and a front elevation of a proposed new home of the Builders' Exchange, in process of construction, picturing workmen in a score of ludicrous mishaps, constituted the design for the title page. President H. S. Kent was master of ceremonies, and he was ably assisted by other officials.

Tacoma, Wash.

During the latter part of the month of February there was a decided improvement in the building activity in this city. Investors are now satisfied that the winter is over and that construction can proceed without interruption during the remainder of the season. As a result of the improved weather conditions a large amount of small building has begun and builders report that there is work ahead to keep the entire trade busy throughout the summer. Some large buildings are being put up, but as a rule the investors are turning their attention to dwelling houses, which seem to be in greater demand than ever, notwithstanding the unusual amount of residences built last year. The enlargement of the business district will call for a large amount of new building contracts as well as for the demolition or removal of a number of smaller buildings. The situation in the building material and labor markets seems to favor builders, although with the unusually active season throughout the coast a shortage of workmen may develop before the season is over.

Trenton, N. J.

The report of Building Inspector George H. Stevenson, covering the fiscal year ending February 28, shows that Trenton has witnessed one of the most active periods in the building line since the office of building inspector was established. The total number of permits issued was 789, covering 1272 new buildings and additions, and involved an estimated outlay of $2,216,154. This is an increase of nearly $1,000,000 over the previous year, which was the second largest in the history of the city. One of the largest

permits issued during the past year was that for the erection of the new wing at the New Jersey State Prison. The other permits cover stores, factories and dwelling houses. The greatest amount of building for any single month was in June last, when the total amount of operations was $430,292. Of the total number of buildings for which permits were issued, 502 were of brick and stone and 456 were of frame construction, while 313 were of a miscellaneous nature.

Wilmington, Del.

The Master Builders' Association of Wilmington, Del., recently held its annual dinner, at which speeches were made by Mayor Horace Wilson, City Solicitor S. D. Townsend, Jr., County Comptroller P. Chandler, Building Inspector William M. Connolly, as well as representatives of different branches of the association. Following the speakers of the evening brief addresses were made by G. A. Brennesien, president of the Master Painters; Madison Smith of the Master Plasterers; E. J. Sharpe, president of the Master Bricklayers, and Henry Stewart, president of the Master Stone Masons. The committee having charge of the affair was composed of J. M. Phillips, Frank N. Overdeer and J. W. Hewes.

Notes.

Preparations for the erection of more buildings than in many years past are being made in Schenectady, N. Y., and this in face of the fact that prices of building materials seem to be tending upward rather than downward. The statement is made that hemlock, which is the principal lumber used by the majority of builders, is selling in that locality at from $28 to $32 per 1000 feet, which represents an increase over last year of more than 25 per cent. Even Southern lumber is selling at an advance of 20 per cent. over the prices of a year ago. Building permits are rapidly being issued, and operations covering a number of houses are under full headway. In fact some are so near completion that it is expected the houses will be ready for occupancy by May 1.

Building operations continue to show an appreciable increase from month to month in Harrisburg, Pa., and during February the value of building improvements was $75,735 in excess of the corresponding month of last year. March has started off in good shape, and Building Inspector Thomas F. Ferree is issuing permits which indicate an active spring season. The business year of the Building Department ends March 31, and for the 11 months already elapsed the value of the building permits issued shows a gain of $413,070 over the corresponding period of last year.

The Mt. Vernon, N. Y., branch of the Interstate Builders' and Contractors' Association held its annual dinner on the evening of February 24, which was a very enjoyable affair. There was vocal and instrumental music as well as some clever speeches. President James Reid as toastmaster spoke encouragingly of the building conditions and prospects of Mt. Vernon, and intimated that 1906 was likely to witness a large volume of operations. The committee in charge of the dinner was composed of Albert S. Jenks, chairman; John Donaldson and Henry M. Downing.

Building prospects in DuBois, Pa., are reported better than they have been at this season for many years past. A considerable amount of work has already been planned and much more is contemplated.

The Master Builders' Association of Fall River, Mass., has declared for the "open shop," and at a recent meeting voted to pay carpenters $2.80 a day, as against $2.50, as heretofore, the new schedule going into effect March 1. It was also voted that no delegate or business agent of the unions shall be permitted in any shop or on any job where the men are working.

LAW IN THE BUILDING TRADES.

By W. J. Stanton.

RIGHT OF CONTRACTOR TO USE STREET FOR STORAGE OF BUILDING MATERIALS.

The right of a contractor or land owner to use a portion of the street for the temporary storage of building material and their liability for injuries caused by such use of the street is discussed at length in the case of Friedman vs. Snare & Triest Company, recently decided by the Court of Errors and Appeals of New Jersey.

The defendant contractor was constructing an addition to a building under a contract with the owner, and piled on the sidewalk adjacent to the building several heavy iron girders, 22 feet long. The girders were piled in an insecure manner, and plaintiff, a child five years of age, while playing on the girders or resting on one of them during play, was injured by the fall of one of them. In discussing the question of the right to store building material on the street the Court says: "In our courts it has been long established that in the absence of anything to show the contrary the title and legal possession of the abutting property owner or occupant extend to the middle of the road or street, the freehold remaining in him subject only to the easement or right of passage in the public."

It is the undoubted right of land owners to deposit in the street building materials required in the improvement of their abutting property, although the public lawfully using the street may be, as in many cases they necessarily are, to some extent incommoded thereby. The right is to be reasonably exercised, in view of the rights of the public, and is subject to regulation in the public interest. Where the ownership of the soil of the street is not in the abutting owner his right to use the street for this and other like purposes is vindicated on the ground of necessity. If the public be unreasonably hindered or endangered the party at fault may be indicted for maintaining a public nuisance or may be required to remove the obstruction. An individual member of the public, if specially injured by the nuisance while in the exercise of his rights in the street, may maintain a private action. But this refers only to parties injured while using the street as a street and not to those whose injuries arise from their attempted use of the obstructing materials for their own purposes, whether of pleasure, convenience or profit. Neither an idler, traveler nor a playful child can gain rights against the land owner or contractor by using such building materials as a resting place or playground.

The owner or contractor is not under ordinary circumstances charged with a duty to render the materials safe for persons who attempt to use them for their own purposes while in the street.

STATUS OF ARCHITECTS' CERTIFICATE.

The agreement in a building contract that an architect's certificate shall be a condition precedent to the contractor's right of payment is to be construed to embody the condition that the arcitect shall exercise his function as arbitrator honestly and in good faith. The architect is usually the agent or representative of the owner, and the rule is a just one. This was held in the case of Halsey vs. Waukesha Springs Sanitarium Company, decided by the Supreme Court of Wisconsin.

Another interesting question raised in this case is whether the lienor loses his lien when the building is destroyed by fire. The rule, as laid down by the Pennsylvania Supreme Court, is that a mechanic's lien primarily has no application to the land; that it attached directly only upon the structure or building on which the mechanic works and reaches the land only because of the inseparability of the building from the land to which it is annexed, and when the building goes out of existence the lien goes with it, because there exists no connecting link between the work or materials supplied by the claimant and the ground.

This rule is expressly renounced in Wisconsin in the above case, the Court saying: "We conclude that the Pennsylvania rule has no place under our statute, and that plaintiff's lien, having once attached to the land, was not detached by the destruction of the building, which defendant had impliedly contracted should remain in existence to enable completion of plaintiff's contract."

WHEN OWNER IS NOT JUSTIFIED IN PAYING PRINCIPAL CONTRACTOR.

Under what facts and circumstances the owner of a building can pay the principal contractor with safety to his own liability is often a difficult question to decide. The case of Page & Son *vs.* Grant, recently decided by the Supreme Court of Iowa, is an interesting case illustrating this point. The defendant paid the entire purchase price to the contractor in strict accord with the terms of the contract, although during the progress of the work he acquired knowledge from certain subcontractors that they were furnishing materials for the building which had not been paid for.

The court held that the owner was not justified in paying the principal contractor, even in strict accord with the terms of the contract, and that where the owner of a building in process of erection was notified of a material man's claim for an amount less than the amount due the principal contractor, and such material man duly perfected his lien, the owner was liable for such amount, regardless of his subsequent payments to the contractor under the strict terms of the contract.

CENTERS FOR ARCHES OF DOUBLE CURVATURE*—III.

By Charles H. Fox.

WE will now proceed to show by means of the diagrams presented in Fig. 8 the practical application to our subject of the development of prisms and the intersections and angles made between planes. For a complete understanding of the problem the student is again requested to make the drawing upon cardboard, when by cutting it in the manner directed he may at once obtain a representation of the solid of the plank and one which will show at least five of its sides and a portion of six surfaces, out of which a rib covering one-half of the circular plan of the sash or frame may be formed.

Let us suppose a portion of a hollow cylinder, as that shown in *a* K 1 C *c* D, of Fig. 8, be inclosed in a prism, of which A B C D may be taken to represent the base; and the prism to be cut by a plane, as that of which the line I' E' is the vertical trace. Let I' A represent the ground line, which divides the two planes of projection. In the relation of this problem to circular arches in circular walls, we may suppose that the circular wall in which the arch may be constructed to be represented in the cylinder, so we may take *a* K 1 and D *c* C to represent the curves, respectively, which belong to the outer and inside faces, as given or represented at the plan. The center with which the plan curves may be drawn is shown in O. We may further suppose that the inclined line I' E' represents the elevation of the top surface of a plank, out of which a rib forming one-half of a circle on circle sash may be formed. The radial lines D A, C B may also be taken as the plans of the ends of the plank, the lines giving the direction for making what are generally called "side cuts"—that is, the lines are the plans only of the cuts. Now to find the true section, as given at the oblique plane, which forms the top of the plank, and determine the true angle of the bevels, as are required in order to give the proper direction for making the side cuts: Square with B A, through A, draw A E; make A E equal in length to that of A E' of the elevation. Now produce A B, as shown to I. Then square with A I', draw I' I. Now joining I E and we obtain the true inclination of the top surface of the plank.

Now, to develop the bevels, proceed as follows: Square with A I, through the points given in D, C and B, produce lines to meet the inclined line I E in the points P, S and H. This gives in E H the length of the top outer edge of the plank. At the points given in S P, square with I E, produce lines indefinitely; then with P and S, respectively, as the centers and the lengths R D and J C of the plan as the radius, describe the arcs at Q and T, drawing E Q, and the true angle which the end of the plank over A D makes with the face A B may be obtained.

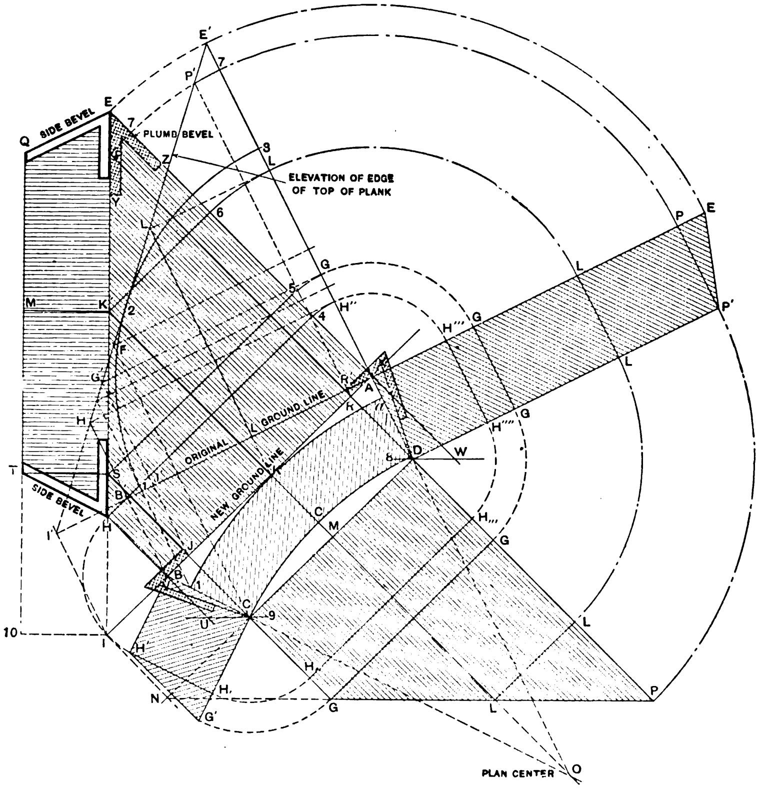


Fig. 8.—Diagrams Showing Application to the Subject Discussed of Development of Prisms and the Intersections and Angles Made Between Planes.

Centers for Arches of Double Curvature.—III.

In a similar manner drawing H T, we may obtain the angle which the end of the plank over C B makes with the outer face. This understood, parallel with H E, draw a line through Q, which line, if the drawing is correct, will pass through the point already given in T. In this manner may the true section of the top surface of the plank be developed.

Now to complete the sides of the model we will proceed as follows: Square with C D, draw D P and C G; set off the lengths D P and C G equal to the lengths of R P and J S, the corresponding lines above; then drawing G P, we may obtain the line in which the side over C D meets the top surface of the model. Square with O A, draw A E and D P'; make the length of these equal to that given in the corresponding lines of the model; then drawing E P', we may obtain the line in which the end over A D meets the top surface of the model. In a similar manner, square with O B, draw B H' and C G'; make the length of these lines equal to that of the corresponding lines as given at the front and back of the model; then drawing G' H', and the model may be completed.

Take a sharp knife and cut through the board at the outline of the drawing; then at the lines H E, A B, A D, C B and C D cut about half through the board. This will admit of the four sides of the model being revolved about their respective base lines, as on a hinge; then with the lines at the exterior fold the sides of the model perpendicularly over the plan. The edges may be touched with glue or fastened together in any manner which suggests itself to the student. This done, the top surface of the model may be folded into place, and if the drawing has been correctly made the student will find it will coincide at each point with the corresponding point as

---

* Copyright, 1906, by Charles H. Fox.

given at the sides of the model. The angles as given in P E Q and S H T will be found perpendicularly over the plan lines, and, as stated above, they are the angles as required to give the proper direction at the top surface of the plank for forming the sides of the plank at the operation of "squaring up the plank." The bevels in question will at the chapters which follow be called "side bevels." The bevel as shown in the angle Y E Z, the construction of which will be apparent from the drawing, we shall hereafter call the "plumb bevel."

In the construction of the diagram, Fig. 1, we explained fully the principles, &c., which governed the projection of lines in space. In the finding of the line H E of Fig. 8, a similar construction was employed; therefore, the principles which governed the projections of Fig. 1, govern that made by the line H E of the model. Our next step was to find the side bevels. The principles which governed the projections made in Fig. 3, were here employed; only instead of making use of the vertical plane of projection, of which the ground line I′ A, forms a part; we made use of the auxilary vertical plane projected in A I E, of which plane the line A I became the ground line, or horizontal trace. In this operation we have in a sense cut off a portion of the horizontal plane, as first given; that portion included in the lines A I I′ A. In the drawing of the lines D P and C S we merely repeated the operation as explained in the drawing of the line E C B of Fig. 3. If this be understood, the principle as here applied in the construction of the bevels, will be found to be that made use of at the similar construction of Fig. 3.

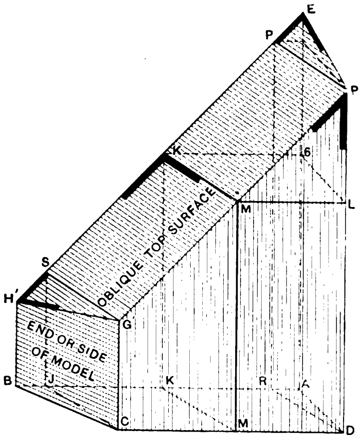


Fig. 9.—Geometrical Elevation of Model.

Centers for Arches of Double Curvature.—III.

It may be noted in connection with the projections given at the vertical plane of projection, first considered; that the only use made of them was that of determining the position of the point I, and that of determining the hight of the point E′ above the ground line I′ A. However, if the student will produce lines from the points given in R K J and B, parallel with the line O A E, to meet the inclined line I′ E′, he will find the divisions thus obtained in I′ H, I′ G, &c., are proportional to the similar divisions already made at the line I E of the model; that is, as the length I′ E′ is to that of I E, so is the length I′ H′, &c., to that of I H, &c. We will at constructions, which follow later, show the manner in which this proportional property of the lines may be made use of in the construction of the necessary face and falling molds. The student may also note the curve line 1 2 3, drawn at the elevation plane. This may be taken to represent the exterior bounding surface of the circle on circle arch, as projected at the elevation proper of the arch. The inclined line I′ E′ has purposely been drawn to meet the curve line in question. This is the method usually employed by other teachers, who have given rules for finding the thickness as required of the plank, out of which a rib may be formed, for any circle on circle sash. We will endeavor to show at the construction of the model following, that this rule is not a general one, that is, it is not applicable to every form of arch, only to that form which may have a conoidal surface, as that of the exterior bounding element of the arch.

We have here at the plan shown another method by means of which the side bevels may be projected: Firstly, through the points given in C and D, parallel with the inclined line G P; draw U 9, and 8 W. Then square with A B, draw B U, C J, A W, and R D. Set off J V and R X, respectively, equal with U C, and D W, joining V C and X D, and the angle of the side bevels may be obtained. Having now the two methods, the student may make use of that which to him seems the better one. In Fig. 9 is shown a geometrical elevation of the model, letters of reference corresponding to those given at similar points of Fig. 8.

(*To be continued.*)

Hotel of Reinforced Concrete and Hollow Tile.

A short time ago we called attention in these columns to the building which was under construction at Atlantic City, N. J., as an annex to the Hotel Marlborough, and to the rapidity with which the work of erection had been carried on. The annex is of reinforced concrete and tile and is an excellent example of use in combination of these materials. The outside walls, supported on concrete columns and girders, are of hollow terra cotta plastered on the inside and out with cement plaster. All the structural parts, such as columns, girders, floors, roofs, balconies, &c., are of concrete interlaced with steel rods.

The piers supporting the columns under the main dome have 12 piles each, and in all there are about 1800 piles, averaging 20 feet in length and 10 inches in diameter at the butt. The wall piers are connected by reinforced concrete beams 4 feet below the surface of the ground to carry the lower story of the wall. For a clear span of 17 feet this beam is 22 inches wide and 12 inches deep.

In the roof construction of the center wing of the building all the beams and rafters are flush on top with the 6-inch roof slab, composed of 1; 2½; 5 hard anthracite cinder concrete made without hollow tiles and reinforced with ½ x 1½ inch bars placed 16 inches on centers.

The dome shell is made of cinder concrete 5 inches thick reinforced by iron bars and is surmounted by a cinder concrete lantern, with 6-foot vertical cylindrical walls and a hemispherical solid concrete roof 14 feet in diameter. All flights of stairs are made with solid reinforced concrete slabs, the construction being such as to give the appearance of the steps having been cut out of the solid.

The annex is known as the Blenheim Hotel, covers an area 128 x 326 feet and is 8 and 12 stories high. It is joined to the Marlborough Hotel by a service bridge and a sun parlor. The exterior is finished in light colored plaster, decorated with colored Moravian tiles and mosaic and dull glazed green terra cotta. The architects are Price & McLanahan, and the general contractors Edwin Gilbert & Co., all of Philadelphia. The structural designs and details were made by the Trussed Concrete Steel Company, Detroit, Mich.

Rule for Coloring Cement Blocks.

On account of the interest manifested at the present time in the use of hollow cement blocks in connection with building construction it may not be amiss to refer to a rule which is claimed to secure good results for coloring blocks of this character. An authority on the subject states that the best proportions are as follows: Two sacks of sand, one sack Portland cement and 15 pounds of red or brown (dry) mortar color, or, in other words, about one-sixth (in weight) as much color as cement. This mixture must be thoroughly turned (dry) four or five times, so that the coloring matter will be evenly distributed throughout the mixture. After this mixture has been turned several times, as stated above, it is a good idea to run the entire mass through a fine screen before adding water, after which proceed as usual.

New Publications.

Building Construction and Superintendence.—Part III: Trussed Roofs and Roof Trusses. By Frank E. Kidder. Size, 7 x 9¾ inches; 298 pages; 306 illustrations. Bound in heavy beard covers. Published by William T. Comstock. Price, $3, postpaid.

This is the first section of the last of the series on "Building Construction and Superintendence," a work upon which the late Mr. Kidder had been engaged several years. His knowledge of general construction was well known to architects and builders through his published works, and his experience, ability and practical good judgment had caused him for several years past to be called frequently in consultation by his professional brethren in connection with intricate and difficult structural problems. It was with this ripe experience and perfect knowledge, both of the subject treated and of the needs of architects and builders, that he entered upon the preparation of what he intended to be his most elaborate and complete work.

Death, however, interfered to prevent the realization of his hopes in this respect, but he was able to complete the first section, which is the volume under review, and to block out what will constitute the second section and which the publisher states will be put in hands familiar with Mr. Kidder's methods and carried out along the lines he had laid down. The present section is therefore presented as Part III, which is in compliance with Mr. Kidder's last letter to the publisher, while the second section will appear later as Part IV of the same series.

A review of the pages of the present volume shows a careful and conscientious discussion of the subject and that in clear language and such simple form as will appeal most strongly to the architect and builder. This section is comprised in eight chapters, the first of which deals with types of wooden trusses and the mechanical principles involved. The second has to do with types of steel trusses; the third with the laying out of trussed roofs, including the bracing of the roof and trusses, while chapter four considers open timber roofs and church roofs; in chapter five the author takes up the subject of vaulted and domed ceilings, together with octagonal domed roofs. Following this is a chapter on coliseums, armories, train sheds, exposition buildings, &c., followed by chapter seven, in which is presented the methods for the computing of purlin and truss loads and supporting forces. The last chapter deals with stress diagrams and vertical loads, the subject being subdivided into trusses systematically loaded and those unsystematically loaded.

The book will be found a useful and convenient treatise on the subject indicated and will do much to simplify the calculations for trusses and roofs which architects and builders are constantly called upon to make.

A most interesting feature of the early pages of the volume is an excellent likeness of the late Mr. Kidder, together with a brief sketch of his life.

House Hints for Those Who Build, Buy, Improve or Rent. By C. E. Schermerhorn; 55 pages. Size 6 x 9 inches. Bound in paper covers. Issued by House Hints Publishing Company. Price, postpaid, 50 cents.

This is the second edition of a practical treatise describing the details pertaining to the site, location, arrangement, construction, decorating and furnishing of the home. The work has been greatly enlarged and revised and covers the subject indicated in a way to prove of interest and value to all prospective home builders or owners. The subject matter is alphabetically indexed and the concluding pages are given over to a list of representative firms in various lines associated with the building business. The little work, as the author puts it, is an earnest attempt to enlighten the home owning and acquiring public to a correct knowledge of practical home building and equipment.

The Lightning Estimator.—By H. James Bradt. Size, 5 x 8 inches; 36 pages. Illustrated. Bound in paper covers. Issued by the Bradt Publishing Company. Price, 50 cents, postpaid.

This little work is now in its third edition, and in preparing it the author has endeavored to add further data and information likely to be of service to those interested in the subject. Estimating is a broad topic and there are many methods of doing the work, but the author believes that for estimating frame and veneered houses, or, in fact, other frame buildings, a careful inspection of his little work will convince the practical builder that it covers the field in a generally satisfactory manner. In the present edition the author has given the price per day of labor, so that it is a comparatively simple matter to adjust the estimates to meet the requirements of any locality. Some useful tables are given, together with illustrations of different styles of cornices on which tables relating to that subject are based. Half-tone engravings of houses selected from work designed and erected by the author are shown and the statement made that the estimates were prepared entirely by the methods given in the book, with the exception of mantels, heating and plumbing.

Finishing Georgia Pine.

In connection with a discussion of the subject of finishing Georgia pine some very interesting information was presented in papers read at a recent meeting of railroad master painters. One of these, by W. S. Hopkins of Cleburne, Texas, was as follows: I find the best way to finish Georgia pine is to first clean off all dirt and pencil marks and to sandpaper smooth all rough places, if there are any, then give one coat of grain alcohol white shellac.

Second coat: Rub down smooth with pumice stone or sandpaper and give coat of any good interior finishing varnish of light color.

Third coat: Rub down to a surface and give one coat of interior finishing varnish of light color, same as second coat, then leave it gloss, or rub down and polish, or leave it dull finish.

I find that any other filler that has or contains oil or wood alcohol will turn the wood dark in a short time.

Another paper, by F. E. Hollpeter, Detroit, Mich., dealt with the best interior natural finish for Georgia pine and was as follows: As pine is very susceptible to finger marks from handling and to dust and will darken from exposure the wood in order to have it perfectly clean and smooth must be sandpapered after coming from the carpenters or cabinet makers.

As soon as it is cleaned and sandpapered until the surface is perfectly smooth dust it and give it a coat of white shellac.

As Georgia or hard pine has a great deal of tar or rosin in it which comes to the surface on being exposed to the heat, and sometimes without, the shellac coat holds this back and also hardens the soft and porous grain of the wood and retards the discoloration of the wood with age.

Georgia pine is a close grained wood and does not require filling, although for a first-class finish I would recommend a comparatively thin coat of light filler before the coat of shellac is applied.

After the shellac is dry putty the nail holes with a white lead and whiting putty, colored with yellow ocher to match the wood. Sandpaper lightly the coat of shellac with about No. 0 sandpaper; dust thoroughly and apply the first coat of varnish, using a good grade of clear or pale varnish reduced a little with turpentine.

The amount of turpentine used depends on the painter a the material he is familiar with.

When the first coat is perfectly dry and hard enough, and if it has dried free of dust, it should be rubbed lightly with double 0 sandpaper, steel wool or curled hair and properly dusted, when the second coat of varnish can be applied, using sauce without reducing.

Should the work require a rubbed finish or a polish use three coats of varnish and rub the gloss of the finish coat down with pulverized pumice stone and oil or water and then polish.

Georgia pine will take on a fine finish if properly handled and some fine effects can be produced by the use of stains.

Georgia or Southern pine after a time often shows up with small streaks and spots in the wood; sometimes

whole boards look as though they were mildewed, which ruins the finish. This is mostly found where a board or casing is next to a damp wall or water pipes.

This can be remedied somewhat by properly coating the back of the wood before erection at such places with a coat or two of shellac; or if that is too expensive use two coats of a hard drying paint to make it moisture proof, as nearly as possible.

All work should be perfectly dry and the temperature about 70 degrees F.

Welsh Slate Industry.

Consul Williams of Cardiff furnishes the following report on the slate industry of Wales: "The depression in the slate industry of Wales, which has continued for many months, is becoming severe. Stocks amounting to thousands of tons have accumulated at Port Penrhyn and Port Madoc, and many of the slaters have gone elsewhere to seek steadier employment. The men had been anticipating a reduction of wages, and when the manager of the Penrhyn quarries announced a reduction of 10 per cent., to take effect January 1, 1906, no one was surprised. The loss in wages will amount to about $100,000 and will affect fully 4000 men, or nearly one-third of the slaters in the United Kingdom. The number in the Kingdom in 1904 was 12,265, but the great majority were employed in Carnarvon, Merioneth and Denbigh shires in North Wales. The town most affected will be Bangor.

"The slate output of Wales for 1904 amounted to 427,730 tons, valued at $6,991,072.77. Most of the slate finds a market in Great Britain, as the exports amounted to only 29,357 tons, of which 25,181 tons were exported from the port of Carnarvon. The total output of slates in the United Kingdom in 1904 was 563,170 tons. This was an increase over 1903, but it was more than 100,000 tons short of the output in 1898, when the high-water mark was reached. The industry has never recovered from the effect of the strike of several years ago. French slate then entered the British market, and it has retained a hold to this day. This combined competition, with the present depression in the building trade, accounts for the dull market for the Welsh slate. The cost of production is, perhaps, another element to be considered, for the French slaters receive lower wages than the Welsh."

Concrete for Large Structures.

At the quarterly meeting of the Association of American Portland Cement Manufacturers held at the Bellevue-Stratford Hotel, Philadelphia, March 14, a number of very interesting papers on cement and its uses were read and leading points were discussed by those present.

Frank B. Gilbreth gave a stereopticon talk on the making and driving of corrugated concrete piles, together with illustrations of buildings erected on this form of construction.

William L. Price described the Hotel Blenheim, at Atlantic City, which is erected entirely of concrete, on the Spanish style of architecture, ornamented with tiles. His paper was supplemented by one read by Henry C. Mercer discussing the artistic treatment of the concrete in the same building. Sanford E. Thompson read a paper on different varieties of sand for mortar and concrete.

Mutual Relief Funds for Employees of Industrial Establishments.

The Bureau of Labor, Washington, D. C., is preparing a report covering the various systems of workmen's insurance and employers' liability, both in this country and abroad. In this connection it is endeavoring to secure information concerning the existence in the United States of what are usually known as establishment funds—that is, mutual relief or insurance funds organized and maintained by the employees of an industrial establishment, or relief funds supported either wholly or in part by the employers themselves. The bureau is desirous of obtaining copies of constitutions, rules and by-laws, blank certificate forms and any other matter relating to funds of this character, and it requests persons possessing data of any kind relative to the existence of establishment funds in this country to communicate at once with Charles P. Neill, Commissioner, Washington, D. C.

Report on the Government Fuel Investigations.

The final report covering the investigations during 1904 at the fuel testing plant at St. Louis, Mo., under the United States Geological Survey, has been published by the Government and is now ready for distribution. The report will appear in three volumes, as Professional Paper No. 48, and will be distributed free of charge. Persons desiring copies of the report should apply for the same to a member of Congress from their district or to a Senator from their State.

Peter J. McGuire, one of the founders of the American Federation of Labor and formerly secretary-treasurer of the United Brotherhood of Carpenters and Joiners of America, died February 19 at his home in Camden, N. J., after a protracted illness.

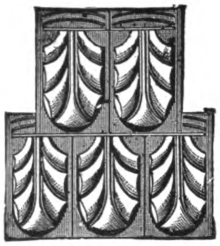
Sheet metal sheds for automobile storage—that is, sheet metal garages—are becoming a factor in the trade of some sheet metal workers. This material is not only cheap, but it makes a noninflammable house that can be easily enlarged or removed if necessary.

CONTENTS.

Editorial—

Correspondence—

Novelties—



NEW CENTURY

PAINTED TIN
GALVANIZED
COPPER : : : :

A SAMPLE
OF THE
NEW CENTURY PATENT METAL SHINGLES

Will convince you that it is the best Embossed of all.
Wanted, good agents.

MANUFACTURED SOLELY BY

The Chattanooga Roofing & Foundry Co.,
CHATTANOOGA, TENN., U. S. A.

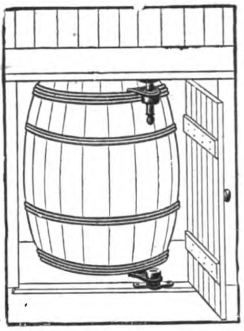
Extra Money for the Carpenter

is quickly and easily made installing the

PERFECTION BARREL SWING

It will adjust to and swing any barrel—no matter how heavy. No more trouble removing moulding board or getting at flour—simply swing barrel out. Nothing better for pantry or cupboard—a child can use it. Simple and practical. If your Hardware dealer won't furnish them send to us.

THE LEAVITT MACHINE CO., Sole Mfrs., Orange, Mass.



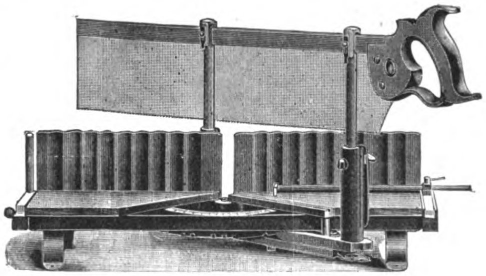
GOODELL MITRE BOX

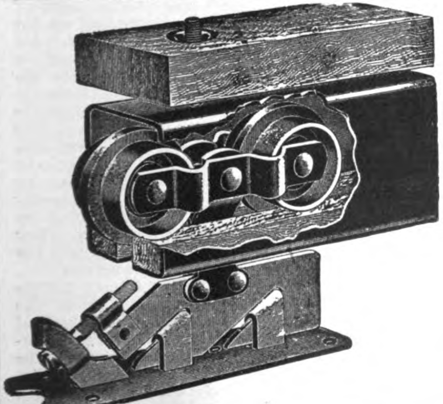
MADE ENTIRELY OF STEEL. NO MORE BREAKING.
FIRST IN QUALITY AND IMPROVEMENTS.

AUTOMATIC STOPS FOR HOLDING UP SAW.
CORRUGATED BACKS. GRADUATED.
GAUGE FOR DUPLICATE CUTS and many other features.

If you want the best you will take no other.
Send for Circular K.

GOODELL MFG. CO., Greenfield, Mass.





No. 122

RICHARDS ROYAL
Ball-Bearing Trolley
HOUSE DOOR HANGER

PERFECTLY NOISELESS

Wheels run on hard maple, adjustment in hanger and track. Track can be easily taken down after walls are plastered. Four sets balls in each hanger.

Write for Catalog of Door Hangers.

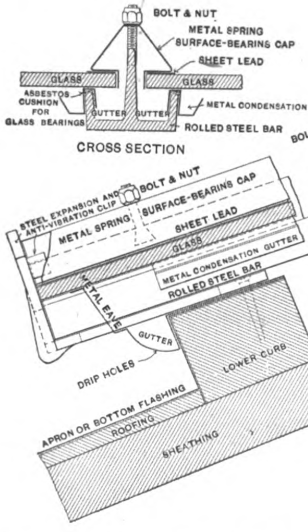
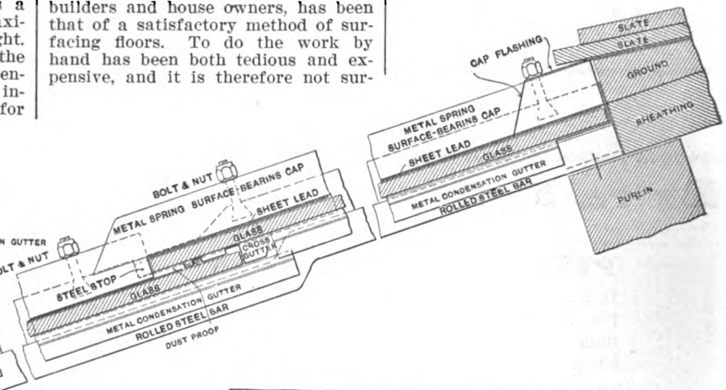
TRADE MARK.

The Richards Mfg. Co.,
Aurora, Illinois.
NEW YORK OFFICE, 101 READE STREET.

NOVELTIES.

The National System of Puttyless Skylights.

A skylight that is storm proof under every condition of wind and weather has hitherto been difficult to secure. The illustrations show a comparatively new system of steel puttyless glazing construction that is well adapted to buildings having large skylight areas. It is the system which will be installed by the New York Central Railroad Company in its new power stations at Yonkers and Port Morris, N. Y., and is controlled by the National Ventilating Company, 1 Madison avenue, New York. The supporting member, as shown in the longitudinal section in Fig. 1, is a rolled steel bar which offers maximum strength with minimum weight. This bar serves as a support for the glass, with flexible bearings intervening, and at the same time, by its inclosed gutters, provides drainage for any leakage. Upon the supporting bar, shown in the cross sectional detail, and the half-tone, Fig. 2, are mounted longitudinal condensation gutters leading to the eave gutters. These condensation gutters rest upon asbestos fibre cushions, which, in turn, rest upon the supporting bar and afford an even, continuous and flexible bearing for the glass to rest upon, which tends to conform to any irregularities in the glass. Two distinctive features of this construction are the elimination of the tendency for the glass to break when contracting or expanding and immunity from leakage. These results are further secured by spring surface bearing caps which have broad bearing surfaces upon the glass with a spring-like action. These caps are provided with vertical lower flanges, which with the flexible cushion bearings prevent the glass from binding or ever coming in contact with rigid surfaces, and at the same time make a permanently tight joint. Another distinctive feature of this system is the use of brass or iron expansion clips, allowing free expansion and contraction of the supporting bar, avoiding the breaking of glass from this cause. As seen from the longitudinal section in Fig. 1, the supporting bar is offset where the glass laps. The cross condensation gutters, emptying into the drainage gutters of the supporting bar, furnish a dust and weather proof flexible bearing where the glass laps, and with the longitudinal condensation gutters afford ample drainage for all condensed moisture. In this construction every light of glass is absolutely independent of every other light and can move freely in any direction under contraction, expansion or vibration, and assume its own position without ever coming in contact with rigid surfaces.

Novelties.—National System of Puttyless Skylights.—Fig. 1.—Longitudinal and Cross Sections Showing Details of the System.

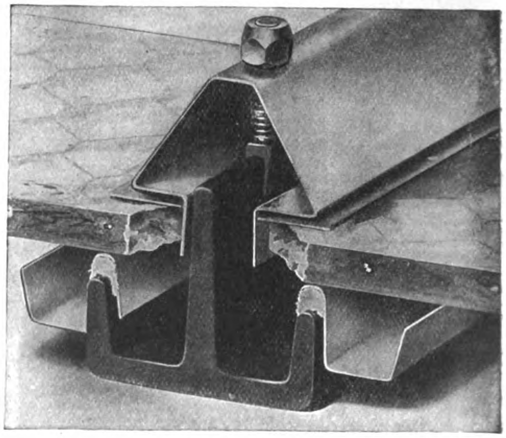


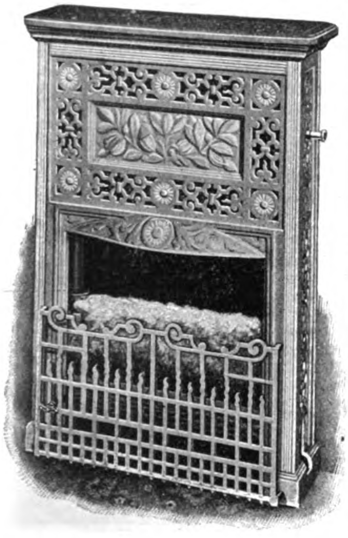
Fig. 2.—Perspective View, Showing Suporting Bar, Condensation Gutters and Clamping Device.

American Floor Surfacing Machine.

One of the problems which has for many years confronted architects, builders and house owners, has been that of a satisfactory method of surfacing floors. To do the work by hand has been both tedious and expensive, and it is therefore not surprising that inventive genius should develop in the course of time a machine which would serve as a most excellent substitute. Among the devices at present on the market especially designed to execute work of the character indicated is the American Floor Surfacing Machine, which has been brought out to meet any contingency arising in connection with the surfacing, cleaning and polishing of floors, be they new or old, hard or soft, and the areas large or small. The frame of the machine is about 6 feet long and carries an electric motor which furnishes the necessary operative power. Two cylinders, one at each end of the frame, are covered with sandpaper and are so arranged that by manipulating a lever they are brought in contact with the floor with increased or decreased pressure according to requirements, at the same time retaining a high rotary speed. The movement of the apparatus in any direction is controlled by another lever and steering device. The construction is such that the dust and dirt caused by the machine passing over the surface of a floor is caught and conveyed to a bag attached to the machine. The arrangement of parts is such, the claim is made, that the machine does not require a skilled mechanic to operate it. In cases where electrical power is not available a small engine and generator in a van in front of the building in which the machine is working can be utilized, the van being arranged so that it may be propelled by its own power or drawn by horses. In these progressive days an ordinary automobile may be constructed to be used as a generator and the machine hauled to and fro on a small trailer attached to it. The claim is made that a machine will do the work of from 10 to 20 men, depending on the size and condition of the floor. Another point which is emphasized by the manufacturer is that it is unnecessary to suspend operations in stores, factories and the like while the floors are being put in condition. The machine can be used for surfacing floors in all kinds of buildings, and the claim is made that it does its work quicker, cheaper and neater than can be done by hand. The device is made by the American Floor Surfacing Machine Company, 610 Examiner Building, San Francisco, Cal., and in this connection it may not be without interest to state that the floors of the new editorial rooms of *Carpentry and Building* were surfaced by one of these machines. The work was done by the local district manager, K. G. Fohlin, 130 East Forty-fifth street, New York City.

Garwood Steam Heater.

The Garwood steam heater, for using gas as a fuel, is the subject of a very neat 16-page pamphlet which reaches us from the Frank C. McLain Company, Canton, Ohio. In bringing this construction to the attention of architects, builders and houseowners generally the manufacturer points out that the Garwood steam heater eliminates the very large first cost of installing the steam or hot water plant, that no boiler or pipes are necessary and that the fire is going only where and when it is needed. The log upon which the gas flames play is really a boiler, the water contained therein being rapidly converted into steam. Behind the logs is a skilfully concealed radiator through which the steam circulates. As it reaches the top of the radiator it condenses and returns as water to the boiler, so that no water need be added, except to make up the loss by evaporation. The bottom log in the Garwood heater contains a water pan and an iron leaf which is suspended from the burner and partly immersed in the water, the result being a constant and gentle vaporization. The Garwood is arranged so that air is drawn in at the bottom of the grade, passes up and over the radiator and out at the top into the room. The burners used are of the Bunsen type and the air taken in with the gas is claimed to increase its heating capacity about 16 times, insuring such perfect combustion that no flue connection with the heater is required. In Fig. 3 of the illustrations is shown a front view of the heater and in Fig. 4 is presented a rear view with a portion broken away clearly indicating the internal construction. In the catalogue before us numerous designs of mantels and fireplaces are presented fitted with the heater in question and in connection with them are tables showing the sizes made, styles of finish and the prices.



Novelties.—Garwood Steam Heater.—Fig. 3.—Front View.

New Plant of Simonds Mfg. Company.

The mammoth new plant of the Simonds Mfg. Company, at Fitchburg, Mass., was dedicated on Wednesday evening, January 17, by a big family party, at which the president of the company, Daniel Simonds, and his wife, together with representatives of the different departments, received the employees and their families. On January 6, last year, the first new shop was dedicated and the past year has witnessed the completion of the rest of the buildings. When the first shop was dedicated last January a solid silver loving cup was presented to Mr. Simonds by the employees, but the dedication this year was entirely informal, but every one had a good time. There was first a reception and then an entertainment, consisting of songs, character sketches and vocal and instrumental music after which there was dancing and refreshments. The main shop of the new plant is 265 x 60 feet in size, three stories and basement in hight. An L adjoining is 128 x 40 feet and four stories high, while the blacksmith shop is 133 x 80 feet. The new power plant and auxiliary buildings form the other sides of a hollow square. The floor space of the new plant is 102,000 square feet and the cost of the buildings has been in the neighborhood of a million dollars. The office staff occupies the basement and three stories of one of the new structures, 60 x 60 feet, on each floor.

Increased Facilities for G. & H. Barnett Company.

By reason of the unusual demand at home and abroad for its Black Diamond files and rasps, G. & H. Barnett Company, proprietor of the Black Diamond File Works, Philadelphia, Pa., has found it impossible to keep pace with trade requirements without very largely increasing the capacity of its already extensive plant. Some months ago the management purchased considerable additional real estate adjoining the works, permitting the erection of a number of buildings in which to accommodate more machinery and the making of large additions to present buildings. These improvements and enlargements have been going on throughout the past year and have now been completed, resulting in a much larger daily production, which it is hoped will enable the company more promptly to fill orders. Notwithstanding this increased capacity the company is at the present time finding it difficult to keep up with the demands of the trade and is several weeks behind on orders.

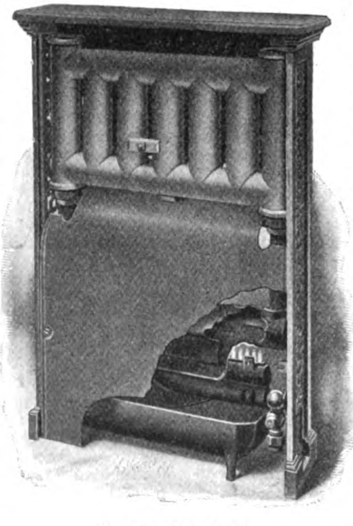


Fig. 4.—Rear View.

The Burt Ventilator.

Those of our readers who use ventilators for bettering the draft of a chimney flue will be interested to learn that the Burt Mfg. Co., Akron, Ohio, has recently begun the manufacture of ventilators. The Burt ventilator, formerly known as the Superior ventilator, and illustrated in Fig. 5, is especially noteworthy for a patent damper, which consists of a sliding sleeve, to regulate the outflow of air from the ventilator without cutting off light in the case of the glass top ventilators or of shaking dust, which is sometimes the accompaniment of the movement of a flat damper. Its general construction is shown in the accompanying illustration. There it has a flat glass top, with heavy wired glass, so that it can be employed both as a skylight and as a ventilator. The damper mentioned is shown, together with the cord and pulley by which it is operated from below. The cord may be fastened at the lower end or a counterbalance made to be used to keep the damper in position. Care is exercised in making the air shaft round, so that the sliding sleeve can be moved without friction, and the shaft is strengthened by heavy bands. When the damper is at its highest point it is in contact with the top, in order to close completely the air outlet from the ventilator. Another of the special details of the ventilator is that below the glass top is a drain into which any water condensed from the air on the under side of the glass can run. The water passes through small holes, indicated in the illustration, to the outside of the ventilator. The Burt is made with a metal top when desired, but otherwise the construction is that described. The regular patterns are built of galvanized iron and the glass top or skylight feature is made flat in sizes as large as 40 inches in diameter, but in larger sizes is given a sectional glass top of pyramidal form.

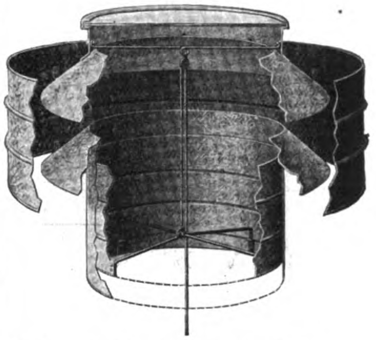


Fig. 5.—The Glass Top Burt Ventilator.

Encaustic Metal Enameled Ceilings and Side Walls.

The Wheeling Corrugating Company, Wheeling, W. Va., and 47-51 Cliff street, New York City, has issued a handsome new illustrated catalogue of encaustic metal ceilings containing 34 pages, each 12 x 9¼ inches. A striking feature of the book is the five full page illustrations of beautiful designs in enameled ceilings in various combinations of cornice, filler, border, corner and field, which are divided into five color arrangements, the colors in *fac-simile* to give an idea of the actual effect when installed. Another point of importance is the flexibility of the various col-

ored enamels on the metal, so that it will not chip or break off in putting on. The metal is covered on both sides to prevent oxidization, and can be sold at approximately 8 to 10 cents per square foot, dependent on the designs. It costs about 5 cents a square foot more than the plain ceilings painted only with a priming coat, so that some of the extra cost is offset by the fact that the work is done when the material is on. Provision is made for having the nails furnished harmonize in color with the metal they hold in place. Each coat of enamel, and also the gold decorations, are burned on to the metal separately under the action of intense heat. Many other beautiful designs in this class of metal ceilings in all the various parts are shown, to be painted after being put on.


Novelties.—Fig. 6.—The Edwards Metal Shingle.

The Edwards Metal Shingle.

We take pleasure in showing in Fig. 6 of the accompanying illustrations the Edwards Metal Shingle, made in tin, galvanized iron and copper, and in the following sizes: 7 x 10 inches, 10 x 14 inches and 14 x 20 inches, the 10 x 14 being the most popular size.

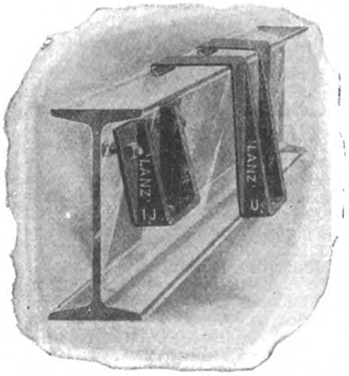


Fig. 7.—Lanz Joist Hangers for I-Beams.

The methods of interlocking the sheets forms a perfect system of contraction and expansion, thereby making them absolutely water tight. It requires no mechanic to lay them, as any one who can drive a nail can do the work, no solder being necessary. The claim is made that they will not buckle, break or rattle, as a tin roof, nor warp or rot like a wooden shingle. They are fireproof, thereby giving a low rate of insurance, require lighter framing than slate, will not break and can be taken off and relaid on another roof without loss. They are particularly adapted for roofs of not less than one-fourth pitch, also for covering mansards, gables, window hoods, bay windows, &c., and give to a house that distinctive appearance, making it stand out prominently, a tribute to the owners and a continual source of satisfaction to the inmates. The shingles are packed 100 square feet in a box ready for shipping, and are made by the Edwards Mfg. Company, The Sheet Metal Folks, Cincinnati, Ohio, who will gladly furnish samples and prices upon request.

Lanz Joist Hangers for I-Beams.

The increasing use of iron and steel in connection with the erection not only of towering office buildings and heavy business structures, but also in private residences of the better class, apartment houses and buildings which call for the equivalent of what would be strong wooden girders, renders interesting some reference to the joist hangers which are adapted for I-beams. A form of steel hanger which is meeting with much favor in the trade and which is manufactured by M. Lanz & Sons, Pittsburgh, Pa., is illustrated in Fig. 7 of the engravings, the picture showing two styles intended to meet varying requirements. One style of hanger is shown secured to the web of the I-beam, holes being punched for the bolts which hold it in place. For supporting joists or timbers with an I-beam the stirrup shown is used, but for which no holes in the beams are required. It may be applied anywhere in the length of the I-beams, according to requirements. Special emphasis is laid by the manufacturers upon the fact that these hangers are such as to lend to substantial construction; that there is no necessity of notching the steel, and that their use eliminates the necessity of cast iron or malleable iron in the very important supports in the interior of a building. The Lanz joist hangers are referred to as being simple in design, made of merchant bar steel of commercial sizes, and of any desired strength, in eight different standard styles and for 66 regular sizes of timber. Each particular style is so designed as to meet the requirements for the framing and different forms of construction found in connection with building operations. The steel of the hanger is so shaped and distributed, it is claimed, that it has substantially the same cross sectional area in either the seat or upper corners as in the body of the hanger. Being made from rolled bars the body of the hanger lies in the direction of the fiber of the bar, and therefore in the most favorable position to resist strain. Another improvement is in the side flanges, providing ample spiking surfaces which fit snugly to the header, thereby making a secure support for the joist, while ordinary stirrups depend largely on the corners to hold the load.

Coltrin Cement Block Machine.

In an attractive little catalogue of 60 pages issued by the Coltrin Mfg. Company, 140 West Main street, Jackson, Mich., are set forth the merits of the cement block machine made by this concern and for which strong claims are presented. The company has been identified with the cement interests for many years and the present is the fourth edition of its catalogue devoted to illustrated descriptions of cement molds "which modern practice has found best suited for the economical manufacture of artificial stone." The illustrations for the most part are half tone reproductions of photographs of buildings constructed of blocks made by the Coltrin Company. Special attention is invited to the improved 1906 model face-down machine, in which the face or impression plate rests on the bottom, thus allowing of tamping directly upon the face and bringing out with good effect every detail of the design. In this way it is claimed a better class of material may be used for the face or front of the block and a coarser material for the back. The machine is so arranged that by allowing the impression plate to rest on the side, blocks can be made alike on all four sides, to be used for chimneys, columns, coping, crown molding, &c. On this machine can be made plain and rock face blocks of all sizes, shapes and many fancy designs. The catalogue is neat in its make up and will be found an interesting contribution to the literature bearing upon the subject of cement block construction.

An Improved Panel Sander.

A machine which will doubtless interest a large class among the readers of this journal is the Improved Panel Sander illustrated in Fig. 8 of the engraving, and designed to give a perfect finish to the raised portions of panels. The sander is strongly and rigidly built throughout, and the sanding disks are carried on spindles running in rigid bearings in housings, thus permitting their adjustment from ¼ inch to 3 inches. The housings angle to the shape of the panel and the disks can be brought to even a horizontal position on top so as to easily change the sandpaper. The rail supporting the stock has a vertical adjustment, permitting the sanding of panels having a raise up to 5 inches in width. The tables are 23 x 16½ inches and the countershaft is mounted on the rear of the frame, thus making the machine entirely self-contained. The builders are the J. A. Fay & Egan Company, 221 to 241 West Front street, Cincinnati, Ohio, and to any one making mention of *Carpentry and Building* they will send full particulars regarding this useful tool.

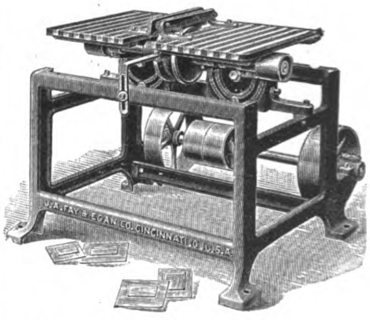


Fig. 8.—Improved Panel Sander.

TRADE NOTES.

Write for circular of bracket hanger and roof bracket is the invitation extended in an announcement presented in our advertising pages this month by the Wagner Mfg. Company, Department F, Cedar Falls, Iowa. Every carpenter appreciates labor saving devices and as the claim is made that 25,000 of those mentioned have been in use during the last year he will doubtless be interested in learning of the merits of the device in question. The bracket hanger has been brought out for the special purpose of providing a safe and convenient device

for holding building brackets in position. It is made entirely of steel and has a double hook, the latter being intended to prevent the bracket from tipping sidewise. In using the hanger it is only necessary to bore two ¾-inch holes into the sheathing so placed that one hole will be on one side of a stud and the other on the other side. The hook part of the hanger swings in a plate and in adjusting it for use it requires but a moment's time. The claim is made that every hanger is guaranteed to support 1500 pounds.

THE DUBY & SHINN MFG. COMPANY, Incorporated, 34 East Twenty-ninth street, New York City, has had so many cases of misunderstanding among the trade by reason of which orders have been filled with the common squares in place of the New Universal because of the fact of the New Universal being numbered 1, 2 and 3 that it is compelled to adopt new numbering, and henceforth the squares will be numbered as follows—viz., the 6 inch will be known as size No. 6; the 10 inch as No. 10, and the 13 inch as No. 13. The maker has just equipped a new factory with special tools and appliances and is in position to fill all orders promptly.

"THE SECURITY BRAND OF ASPHALT ROOFING" is the subject of a very neatly printed and interesting folder, which is being distributed by the National Roofing Company, Tonawanda, N. Y. The merits of this roofing are set forth in convincing style, and in addition is Æsop's fable of the ass, with a modern interpretation. The folder is printed in colors and illustrated with sketches designed to emphasize the important points.

THE LORD'S COURT BUILDING COMPANY was incorporated on March 11 with the Secretary of State, the object of the corporation being to take over for investment purposes the Lord's Court Building, on the corner of William street and Exchange place, New York City. The directors of the company are C. M. Truax, A. R. Hager and F. L. Zabriskie, all of New York.

THE EUREKA ELECTRIC MITRE MACHINE COMPANY, Bloomington, Ill., is bringing out a new miter machine which will give a cut 1 inch greater than those now on the market, and arrangements are being made to build a machine with an 18-inch blade which will meet the requirements of the average finisher and produce most of the miters required in furniture making.

THE MONTROSS METAL SHINGLE COMPANY, Camden, N. J., has just issued another edition of its handsome catalogue describing the advantages of each of its several styles of shingles, and a copy of it will be forwarded to any address on application. The statement is made that the concern is placing on the market many new designs intended to meet varying requirements and that the metal shingles are meeting with a growing popularity. Reference is made to the fireproof and stormproof qualities and to the fact that the shingles can be easily and cheaply laid by any one capable of using a hammer and nails and with sufficient intelligence to follow the printed instructions sent with each shipment.

THE PIKE MFG. COMPANY, Pike, N. H., is distributing a neat souvenir in the shape of a combined paper weight, blotter and sharpener, which will be sent to the trade on request. The souvenir is of circular form, about 5 inches in diameter, and comprises a small corundum wheel surmounting and attached to half a dozen blotting pads. The wheel serves as a handy sharpener for pocket knife, ink eraser, &c., and the whole forms a useful and attractive desk auxiliary.

THE SLATINGTON-BANGOR SLATE SYNDICATE, James L. Foote, general manager, Slatington, Pa., is favoring its friends in the trade with a huge poster calendar for the new year, the top being bound with a metal strip and provided with an eye for hanging upon the wall. The printing is in a deep blue and red upon a white ground and the figures for the days of the week and month are of such a size that they can readily be seen at a distance. The upper part of each sheet carries the name and address of the syndicate, with the information that it mines, ships and exports roofing slates, natural slate blackboards and roofers' supplies. The empty spaces in the calendar for the different months are utilised to call attention to features of the slate business, thus making the calendar serve a double purpose.

A LITTLE PAMPHLET which will be found of more than ordinary interest to builders just at the present time when hollow building blocks are growing so rapidly in favor in many sections of the country has been issued by the Stewart Cement Block Machine Company, Waterloo, Iowa. The description of the hollow block as a building material is presented in such a way as to strongly appeal to architects and builders, and in addition to numerous illustrations showing the Stewart cement block machine and some of the many applications of its product, tables are given of the sizes and designs of blocks which can be produced. Not the least interesting are figures showing the cost of stone, of brick and also of wood construction as compared with that of cement blocks. In each case the figures given are in favor of the blocks. Numerous testimonial letters are a feature of the little work and its general make-up is such as to render it an acceptable addition to the architect's and builder's collection of trade literature.

ARCHITECTS and builders will be interested in the announcement presented in another part of this issue by the King Mantel Company, 652 Gay street, Knoxville, Tenn., manufacturers of the King mantels, which are referred to as being strictly high grade and of medium price. A little book has been issued by the company entitled "Evidence," and a copy of it will be sent free to any architect or builder stating the number of mantels wanted. The company has also issued a 72-page catalogue, 11 x 14 inches in size, showing various designs of mantels, grates, tiles, &c., and this, with the copyrighted supplement, entitled "Colonial Beauties," will be sent to any address on receipt of 12 cents to cover postage.

A FOLDER, which reaches us from the Automatic Building Block Machine Company, Jackson, Mich., calls attention to the merits of hollow or veneer concrete buildings blocks and the machine by which they are made. Numerous illustrations are given of buildings erected from blocks of the character indicated and there is also a view of the Automatic building block machine, showing its appearance just after a block is landed. The point is made that no painting or repairing is required where these blocks are used and that the continuous air space renders it easy for the plumber to insert water or gas pipes and at the same time it is convenient for electric wiring. The blocks are made face down, permitting of a rich and dense face of fine material, which may be colored to suit the fancy of the builder. On this facing is placed a heavy concrete, which constitutes the body of the block.

THE CEMENT MACHINERY COMPANY, Hall Building, Jackson, Mich., calls attention in its advertising card this month to the Normandin block machines, for which strong claims are made. The company points out that it is prepared to furnish concrete block, brick, post and mixing machinery, all of which is of a nature to prove highly interesting to contractors and builders, and reference to some of which has recently been made at length in our Novelties Department. A catalogue illustrating and describing in detail the specialties turned out by this concern can be obtained on application.

JOHNSON'S SCAFFOLD BRACKET HOOK is the subject of an announcement presented in our advertising pages this month by the Bracket Hook Company, 119 North Winnebago street, Rockford, Ill. The device is referred to as simple, strong and cheap, the hook being 10 inches long and made of the best malleable iron. Where this hook is used the claim is made that there is no wiggling or falling of scaffold, that the hook is easy to put on the bracket and that the bracket is readily applied to the building. By the use of this device lathing can be commenced before the siding is finished, as the scaffold brackets are not in the way. The bracket can be removed without the use of a ladder and the strength is such that it will carry when erected any weight usually placed on scaffolding. One man can erect his own scaffolding and the company guarantees the construction to be perfectly safe and strong. A little folder illustrating and describing the scaffold bracket hook has been issued by the company and a copy of it can be obtained on application to the address given.

THE WEST END MFG. COMPANY, 73 Murray street, New York City, is manufacturing Enduroid high grade roofing made in ½, 1, 2 and 3 ply thicknesses. What its maker claims for it is that it is proof against water, weather and acids and is air tight in all climates and under all conditions. It is black in color, coated on both sides when made and therefore does not require painting for the first two or three years. As it is always pliable the point is emphasized that it is easily applied. It is marketed in rolls 36 inches wide, containing two squares or 216 square feet.

THE PARKER HOIST & MACHINE COMPANY, 973 North Francisco avenue, Chicago, Ill., has issued a neat little catalogue of 40 pages illustrating and describing various forms of contractors' machinery, such as derricks, winches, mast tops and bottoms, boom plates, grab hooks and chains, jib cranes, traveling cranes, chain hoists, blocks, trucks, barrows, &c. Special reference is made to the Parker derrick, which is offered in sizes adapted to meet varying requirements. The company points out that it is constantly making improvements and that it is prepared to build special machinery along the lines indicated.

THE CENTRAL CONCRETE & CONSTRUCTION COMPANY, with a capital stock of $25,000, has just been incorporated at Louisville, Ky., for the purpose of turning out concrete building blocks. The officers of the new company are: Robert C. Morris, president; Taylor Brown, first vice-president; H. V. Bomar, second vice-president; C. J. Meddis, secretary, and Arthur Kaye, treasurer. A large plant will at once be erected and contracts have already been made for the construction of several buildings, making use of the concrete blocks.

THE MALLEABLE IRON FITTINGS COMPANY, Branford, Conn., has just issued from the press a neat little pamphlet of 32 pages relating to the leading lines of zinc coated cut and wire nails which it is prepared to furnish. This little work has been brought out in reply to the great number of inquiries which have been received regarding the zinc coated nails made by the company, and within its covers is presented more or less information on the subject of zinc coating, which process is generally known as "galvanizing." The introductory pages are given up to a short chapter by W. T. Flanders, the superintendent of the galvanizing and tinning department, as to what constitutes a properly galvanized article. Mr. Flanders is an expert in the business and is the author of a work on "Galvanizing and Tinning," published by the David Williams Company, New York City. The little pamphlet under review is made up of two sections, one of which is devoted to cut nails and the other to wire nails.

"THE MILES CONCRETE BLOCK MACHINE" is the subject of a neat little pamphlet in colored paper covers which is being sent out by the P. B. Miles Mfg. Company, 23 Dwight Block, Jackson, Mich. The construction and operation of this machine is described at length and in addition there are illustrations of buildings, in the construction of which blocks turned out by this machine have been used. The closing pages of the little work are devoted to a short chapter upon concrete and reasons why a builder should purchase a block machine, especially of the Miles type.

Carpentry and Building
WITH WHICH IS INCORPORATED
The Builders' Exchange
PUBLISHED MONTHLY
To all parts United States, British America and Mexico. - $1.00 Per Year
To all other Countries, - - - - - - - - 1.25 Per Year
Advertising Rates on Application.

BUSINESS OFFICES.
NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHERS....................14-16 Park Place.
PHILADELPHIA—S. S. RECKEFUS, Manager..Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—WALTER C. ENGLISH, Manager....................Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, Manager....................Park Building, 357 Fifth Avenue.
CHICAGO—A. A. AINSWORTH, Manager....................Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—HENRY SMITH, Manager....................Pickering Building, Fifth and Main Streets.
CLEVELAND—EZRA S. ADAMS, Manager....................The Cuyahoga, 311 Superior Street.
ENTERED AT THE POST OFFICE, NEW YORK, AS SECOND-CLASS MATTER.

Johnson's Wood Dye

"For the Artistic Coloring of Woods"

Johnson's Wood Dye is the result of years of experimentation. Because of its acknowledged superiority it has met with wonderful sale. Don't confound Johnson's Wood Dye with various "stains" now on sale. Water "stains" and spirit "stains" raise the grain of the wood. Oil "stains" do not sink deep into the wood, nor do they bring out the beauty of the grain. Varnish stains do not properly color the wood—the color being only in the finish. When varnish finish is marred or scratched it shows the natural color of wood—revealing the sham. Johnson's Dye is a dye. It penetrates the wood, does not raise the grain; retains the high lights and brings out the beauty of the wood. Johnson's Dye is the best for use on floors, interior woodwork and furniture.

Don't buy "stains" but be sure to get Johnson's Dyes if you desire best results.

Johnson's Wood Dye, any desired shade, is sold by the best paint dealers. Insist on getting the genuine—don't take a substitute.

Johnson's Dyes are Prepared in all Shades as Follows:

No. 131, Brown Weathered Oak; No. 129, Dark Mahogany; No. 172, Flemish Oak; No. 140, Manilla Oak; No. 126, Light Oak; No. 110, Bog Oak; No. 123, Dark Oak; No. 128, Light Mahogany; No. 121, Moss Green; No. 125, Mission Oak; No. 178, Brown Flemish Oak; No. 130, Weathered Oak.

One-half pint cans	**30 cents**	**Quart cans**	**85 cents**
Pint cans	**50 cents**	**Gallons cans**	**$3.00**

One gallon covers 700 square feet upon hardwood, 400 square feet upon soft wood. It is very easily applied with an ordinary paint brush.

Special FREE Offer. We will send you a sample any shade, absolutely free for your paint dealer's name.

Send for FREE Book. We have just published a new edition of the interesting, practical book, "The Proper Treatment for Floors, Woodwork and Furniture" that we will send you free on request. This is illustrated from life and written by a wood-finishing authority with over 23 years' experience in this line of work. Contains many ideas for your business. Write us now. Mention edition CB4.

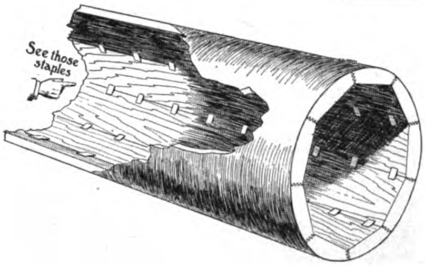
S. C. JOHNSON & SON, = = Racine, Wis.

"The Wood-finishing Authorities."

THE ONLY PERFECT AND RELIABLE LOCK JOINT COLUMN MADE

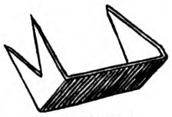
WRITE TO-DAY

PATENTS
PENDING



Columns are glued up under enormous pressure and then the staples are driven in as shown in illustration by our special machinery.

FREE OFFER On Receipt of Postal saying where you saw this Adv. we will send you postage paid a Sample Section of this Column showing the wonderful Lock Joint.



Cut of Staple is three quarter size.

THEY CANNOT OPEN AT THE JOINTS

Put them where you will, in the hottest room, the driest or dampest climate, they POSITIVELY WILL NOT OPEN. WE GUARANTEE IT.

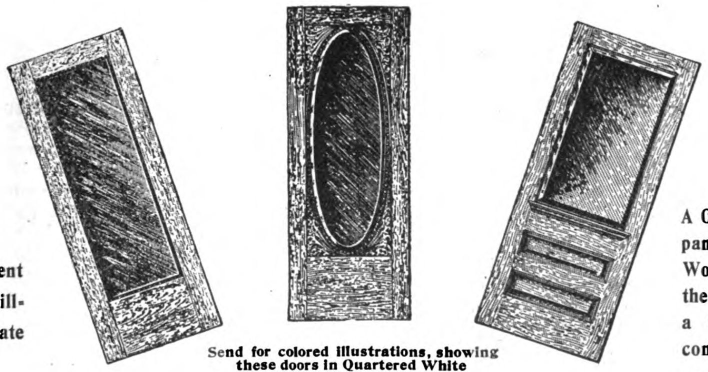
Made only by

AMERICAN COLUMN COMPANY, BATTLE CREEK, MICH.

DON'T TAKE SUBSTITUTES.

Our Line Of

Hardwood Veneered Front Doors



Send for colored illustrations, showing these doors in Quartered White Oak with net prices

A large assortment of all kinds of Millwork for immediate delivery.

A Guarantee accompanies every order. Workmanship is of the highest grade, as a trial order will convince.

Carpenters and Builders

This is a picture of Our 200 Page Catalogue, just off the press, and ready to mail upon request, WITHOUT CHARGE

6 x 9 inches
Over 700 illustrations

Schaller-Hoerr Company

416-426 Blue Island Ave., Chicago, Ill.

Wood Carvings

Hand and Machine Carvings, Mouldings, Festoons, Newel Posts, Head Blocks, Rope and Twist Balusters and Ornaments. We also make a specialty of Fine Staved Up Quartered Oak and Birch Columns for Interior Work.

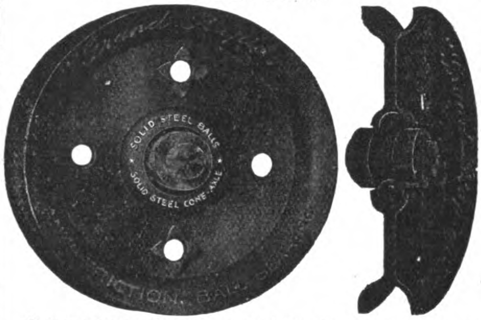
Almost 1,500 designs illustrated in our New Catalogue and Price-List No. 20. Mailed for 15c. in stamps.

Waddell Mfg. Co.,
Corner Taylor and Coldbrook Sts.,
GRAND RAPIDS, MICH., U. S. A.

No. 0575

Going to Build?
OUR CATALOGUE #25 WITH PLANS AND PLATES TELLS YOU ALL ABOUT IT, 800 PAGES, 6000 DESIGNS.
SEND 20¢ FREE FOR POSTAGE
THE FOSTER-MUNGER CO., CHICAGO, U.S.A.
HARDWOOD VENEERED DOORS, ART GLASS, BLINDS, COLONIAL COLUMNS, PORCH WORK, SASH, ETC.
GRILLES, MANTELS, STAIRS, WOOD-CARPET.

PATENT PENDING.



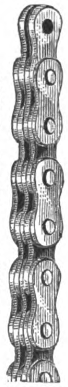
"Ball-Bearing" Grand Rapids All-Steel Sash Pulleys
Are sold DIRECT to BUILDERS, CONTRACTORS and MILLS,
At prices under the common ordinary goods.

If you make ten or ten thousand window frames, we can save you money and give you a superior sash pulley. We are the largest sash-pulley makers in the world. We ship direct, or through dealers and jobbers everywhere.

Write for catalogue and free samples and prices on half-gross, gross, barrel or any quantity.

Direct from the Makers to you. Inquiries welcome.

GRAND RAPIDS HARDWARE CO.,
3 PEARL STREET, - - - GRAND RAPIDS, MICH.



THOMAS MORTON,
169 Elm Street, New York.
Copper Cable, Champion Metal,
Steel Cable, Steel Champion,
SASH CHAINS.
CHAINS
For Suspending Heavy Doors, Gates, etc.
All of SUPERIOR QUALITY.

KING MANTELS

Are strictly high grade mantels at the price of medium. A hackneyed statement, but true in this case, and possible because we are located in the heart of the hardwood country, with labor conditions much in our favor. All intermediate profits are eliminated. you are dealing with the manufacturer direct.

Our little book, "Evidence," is proof, and will be sent free if you will state number of mantels wanted.

Our elegant 72 page catalogue (11 by 14 inches) of mantels, grates, tiles, etc., is the most complete book of its kind ever issued. This and our copyrighted supplement entitled "Colonial Beauties" both sent on receipt of 12 cents to pay actual postage

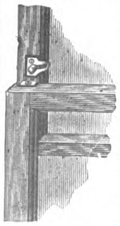
KING MANTEL COMPANY
652 Gay St., Knoxville, Tenn.

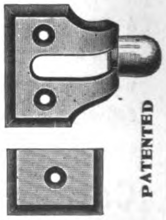
SPECIAL OFFER TO CARPENTERS
BUILDERS AND OWNERS OF HOMES

Ives Patent Window Ventilating Lock, a Safe-Guard for Ventilating Rooms, Pure Air, Good Health and Rest Assured.

To introduce this article, Four Ventilating Locks in genuine Bronze, Brass or Antique Copper Finish will be mailed to any address prepaid for One Dollar. Will include a forty page Hardware Catalogue and Working Model to Carpenters who wish the agency to canvass for its sale. Address

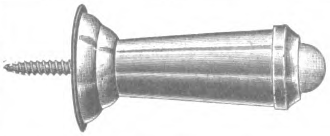
THE H. B. IVES CO. NEW HAVEN, Conn., U. S. A.





Easy Lessons in Roof Measurements. Twelve Short Lessons on Figuring from Architects' Drawings the Amount of Material Required to Cover a Given Surface in Flat, Hipped or Irregular Shaped Roofs. 31 pages, 12 illustrations .... .25

For sale by David Williams Co., 14-16 Park Place, N.Y.



The Champion Wrought Metal Base Knobs
NEVER BREAK
(TRADE MARK)

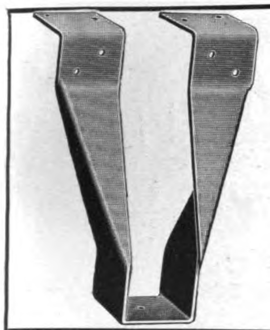
Can be screwed into hardwood without injury. Ingeniously constructed rubber button easily replaced. Made in either Steel, Brass or Bronze and all Finishes to match other hardware. Manufactured only by

THE CHAMPION SAFETY LOCK CO., Geneva, O.

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from
UNIVERSITY OF MICHIGAN



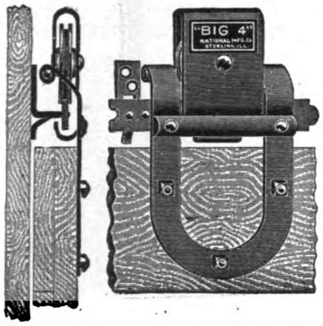
ASK YOUR DEALER FOR

Lane Bros. Co. JOIST AND TIMBER HANGERS.

Made in more than one hundred listed sizes.
Any special size or modification to order.

Manufactured by

Lane Bros. Co.,
(THE DOOR HANGER MFRS.)
423-455 Prospect St., POUGHKEEPSIE, N. Y.



"BIG 4" FLEXIBLE DOOR HANGER.

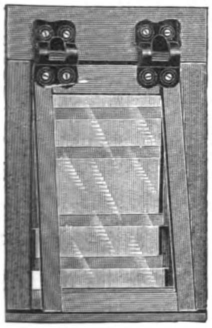
Anti-Friction. Cannot Jump the Track.
Exclusive Sale Given.

NATIONAL MFG. CO.,
STERLING, ILL.

Grand Rapids Wood Carving Co.,

GRAND RAPIDS, MICH.

Catalogue on application.



Full-length window screens keep out all the flies and protect the windows. Screens attached with

GOSSETT'S Detachable Suspension HINGES

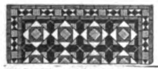
are easily put up or removed—no tools or ladder necessary. Write for free sample pair. Price per Doz. pairs $1.20 (Express paid), Sold by Hardware and Lumber Dealers.

Manufactured by

F. D. KEES MFG. CO. Beatrice, Nebr.

GRILLES "Direct from Factory" MANTELS

No. 225—48x12 inches, **$3.60.** Retail value, $7.00.
No. 230—48x14 inches, with Curtain Pole, **$4.50.** Retail value, $9.00.
Others from $2.50 up. Largest assortment. Division Screens and special Grilles to order.



Tile and Mosaics for everywhere.
Walls, Floors, etc.

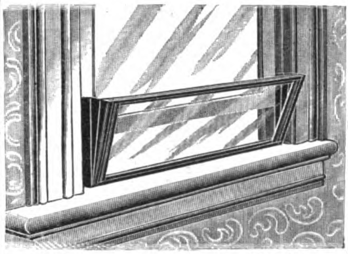
$13.25 buys this solid oak Mantel, 80 in. high, 54 or 60 inches wide, 28 x 16 Mirror. Heavy columns and elaborate capitals. Tile facing and hearth with Plated Frame and Club House Grate, $10. extra.

HARDWOOD FLOORS
will last as long as the house. Any carpenter can lay it easier than ordinary flooring. Get our prices.

Write for catalog of Mantels, Grates, Tiles for floors and baths, Slate Laundry Tubs, Grilles, etc. It is free. Or send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from **$12** to **$200.**

W. H. OSTENDORF, - - - - - - - 2417 N. Broad St., Philadelphia, Pa.

The Ideal Ventilator



10 Reasons Why

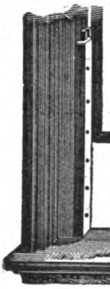
This ventilator is the ideal one in fact as well as in name are given in our catalogue. When you read them you will understand why so many are being sold.

Send for Catalogue.

Ideal Ventilator Company,
340 Weybosset St.,
PROVIDENCE, R. I.

Branches: Boston Philadelphia New York
AGENTS WANTED.

King's Automatic Weather Strip. Window and Door Stop.



The only perfectly satisfactory weather strip, window and door stop on the market.
Keeps out cold and dust.
Makes a perfectly tight joint.
Windows can be raised and lowered to desired position without the use of fasteners or of weights.
Do not build a house until you have investigated the merits of these strips.
Write for prices.

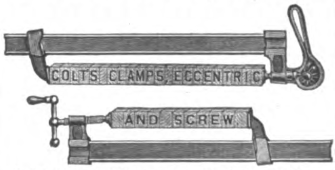
MANUFACTURED BY
The King Manufacturing Co,
Newton, Ia.

GRINDSTONES.

Mounted Grindstones for Carpenters' or Anybody's Use.

THE CLEVELAND STONE CO.,
6th Floor, Hickox Bldg. CLEVELAND, O.

COLT'S CLAMPS



Quick Acting—Time Saving. We make 35 different styles of Clamps to meet the requirements of all classes of WOODWORKERS.

Ask for catalogue No. 129.

BATAVIA CLAMP CO.
23 Center St., Batavia, N. Y.

LORENZEN
MANTELS
AND GRILLES

Also contractors for Ceramic Mosaic and Tiles, Interior and Decorative Marbles, also manufacturers of Improved Scagliola for Bathrooms, Vestibules and Interior of Lobbies and Corridors in Banks, Libraries, Hotels and Public Buildings.

To Carpenters and Builders. FREE.

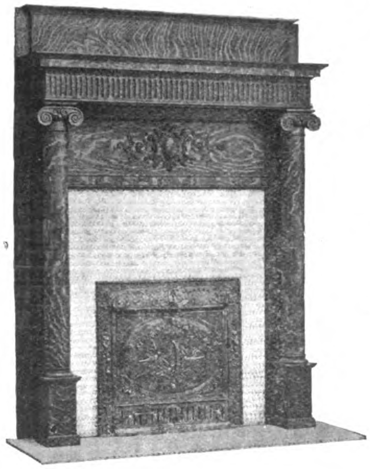
We will mail our large, handsome 96 Page (10 x 12) Catalogue, the largest Mantel and Grille book ever published, which costs us nearly 50 cents. Send us your business card and we will show you a way to make money by becoming our sales agent for your territory.

Write To-day.

CHAS. F. LORENZEN & CO., Inc.
253 North Ashland Ave., Chicago.

We have just shipped a carload of our Mantels and Interior Finish to the United States Legation Buildings, Pekin, China.

LORENZEN PAYS THE FREIGHT



If It's a Question of $ $ $
We Can Answer It.

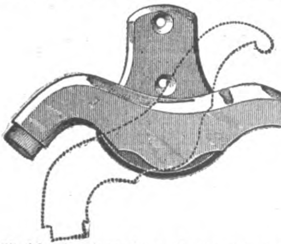
Our Splendid Line of MANTELS, Ranging in Price from $5.00 to $200 Will Make it an Easy Matter to Find

The RIGHT MANTEL at the RIGHT PRICE.

VISIT OUR SHOW ROOMS. SEE THE GOODS
Or else write TO-DAY for our Catalogue. It's FREE.

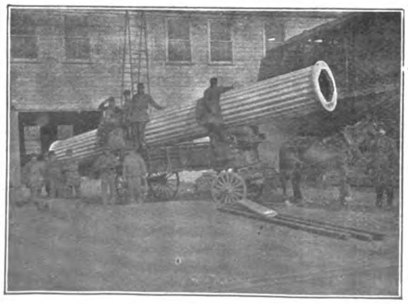
THE A. W. BURRITT CO., 400 Knowlton St.,
"THE MANTEL FOLKS," Bridgeport, Conn.

EMPIRE DOOR HOLDER IMPROVED



Holds the heaviest doors on polished floors. 50% greater pressure than any other. Easy to put on, easy to use; the toe operates it. Write for circulars to

CALDWELL MFG. CO.,
5 Jones Street, Rochester, N. Y.



THE LARGEST LOCK JOINT COLUMN EVER BUILT.

40½" in diameter, 33-10 in. long.

One of four furnished by us for the Portico of the Allenhurst Club, Allenhurst, N. J.

HARTMANN BROS. MFG. CO.
Mt. Vernon, N. Y., U. S. A.
New York Office: 1123 Broadway.
Also
Henry Sanders Co., Chicago, Ill.
A. J. Koll Planing Mill Co.,
Los Angeles, Cal.

MANUFACTURERS OF
KOLL'S PATENT LOCK JOINT COLUMNS FOR PERGOLAS, PORCHES OR INTERIOR USE.
Send for Catalogue D 19.

— Doubted Its Newness.—In a certain home where the stork recently visited there is a six year old son of inquiring mind. When he was first taken in to see the new arrival he exclaimed:

"Oh, mamma, it hasn't any teeth! Oh, mamma, it hasn't any hair!"

Then, clasping his hands in despair, he cried: "Somebody has done us! It's an old baby."—*Philadelphia Public Ledger.*

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

THE FORBES FURNACE

You run no risk in putting in the Forbes Furnace.

Every one guaranteed if properly installed. No sheet iron drums—entirely cast iron radiating tubes ½ inch thick. Will wear for years.
Send for new catalogue and full particulars.

TUBULAR HEATING AND VENTILATING CO.
228 QUARRY ST., PHILADELPHIA PA.


MANTEL TYPE
to fit ordinary fire place.

HEAT
When and Where You Want It

Garwood Heaters
Steam and Gas Combined

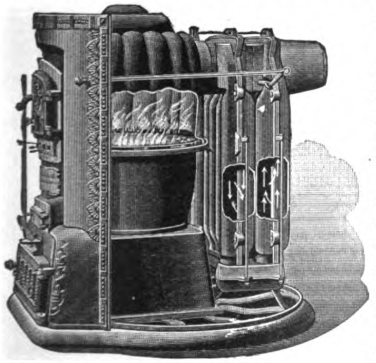
No Flue Required. No Odor. Atmosphere Kept normal. Burn no more Gas than two ordinary Illuminating Burners. Change a Cold Room to a Comfortable One. Send for Catalogue

The Frank C. McLain Co.
900 So. Cleveland Ave., Canton, Ohio


PORTABLE TYPE
to set anywhere in room.


Next to sunshine-warmed air, a well installed high-grade
Warm Air Furnace
is the ideal warming and ventilating apparatus for small homes. Insist that your dealer keep to the specification
" Made by the
INTERNATIONAL HEATER CO.,"
UTICA, N. Y.
New York. Boston. Chicago.

THE BEST IS THE CHEAPEST



The BENGAL FURNACE

has stood the crucial tests imposed upon it in various places and always came out the victor.

The best evidence of its superiority is that imitators are trying to sell their wares on the merits of the BENGAL, saying it is "just as good."

There are none "just as good."

Full particulars on application.

THE FLOYD-WELLS CO., - Royersford, Pa., U. S. A.

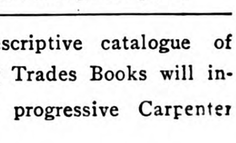
"How to Set Up Your Own Furnace"

Free

Whether you're building a new house or have an old one; whether it is a school, store, church or other place to heat, you need our brand new illustrated furnace book, "Modern Furnace Heating." It is valuable, instructive; a 40-page book that explains the mysteries of house heating, ventilating, where to put the furnace, how to locate the registers, pipes, chimney, etc. It tells how to warm fresh oxygen from outdoors, without introducing cold drafts. A detailed explanation is given of how we sell the

No. 45 Leader Steel Furnace

for $49 and pay freight east of Omaha; how you can set up this furnace without expert help from plans we furnish free. Write for this excellent book. It s free. Send us a plan of your building. We'll send estimate free. Do it now.



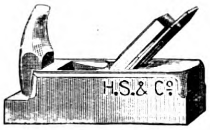
Hess Warming & Ventilating Company,
709 Tacoma Building, Chicago, Ill.

OUR descriptive catalogue of Building Trades Books will interest every progressive Carpenter and Builder.

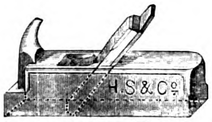
DAVID WILLIAMS CO
232-238 William St., N Y

IMPORTED BENCH PLANES

Extra Quality German White Beech, Hand Made, With Buck Bros. Irons



Horn Smooth



Horn Shrup

No. 401. Double Horn, Smooth, with either 1 7-8, 2, or 2 1-2 inch Iron. } **$1.00 Each** f. o. b. New York

No. 402. Single Horn, Shrup with either 1 1-4, 1 3-8 or 1 1-2 inch Round Nose Iron. } **65 cents Each** f. o. b. New York

To those who prefer wood planes we recommend very highly the German *genuine* White Beech Planes. For wearing qualities they compare very favorably with the more expensive boxwood planes. We offer, for a limited time only, a small quantity at above prices. (They are too heavy to be sent by mail.)

HAMMACHER, SCHLEMMER & CO.,

HARDWARE, TOOLS, SUPPLIES and PIANO MATERIALS

NEW YORK SINCE 1848.

4th AVE. & 13th ST. **(BLOCK SOUTH OF UNION SQUARE.)**

"Forstner" Brace and Machine Bits

For Fine Carpenter, Cabinet and Pattern Work

Specially Adapted for Hardwood Working.

The Forstner Labor-Saving Auger Bit, unlike other bits is guided by its *Circular Rim* instead of its centre; consequently it will bore any arc of a circle and can be guided in any direction regardless of grain or knots, leaving a true polished surface. It is preferable and more expeditious than chisel, gouge, scroll-saw, or lathe tool combined, for core-boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon moulding and mortising, etc.

To introduce this high grade tool among carpenters, pattern makers, and others, we will mail to any reader of "Carpentry and Building," upon receipt of 50c. any bit we make from ¼ inch to 1 inch in size.

Manufactured by

The Progressive Mfg. Co., Dept. "A", Torrington, Conn.

Enquire of your Hardware Dealers or write us direct. Supplied in Sets. Write for Catalogue.

CONTRACTORS

Young men desiring to fit themselves for Contractors should fill out and send this advertisement to us to-day and receive our 200 page handbook (FREE) describing our Contractors' and Builders' course, and over 60 others, including Architecture, Architectural Engineering, Architectural Drafting, Carpenters' course, Electrical, Mechanical and Civil Engineering, Heating, Ventilation and Plumbing, Mechanical Drawing, etc.

American School of Correspondence

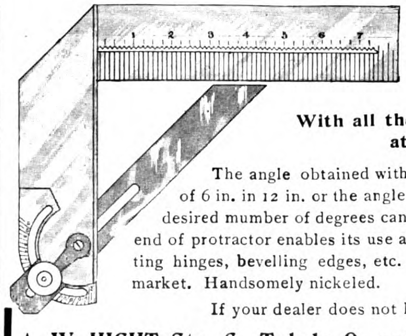
Chicago, Ill.

Name..

Address..

City and State..

C. & B. 4-06



PATENT APPLIED FOR

HIGHT'S UNION COMBINATION SQUARE

With all the Combinations Available at the Same Time

The angle obtained with its use is one that will give a rise of 6 in. in 12 in. or the angle for bottom of rafter for ¼ pitch. Any desired mumber of degrees can be obtained instantly. The notch in end of protractor enables its use as a guage for getting in corners, setting hinges, bevelling edges, etc. The best tool of its kind on the market. Handsomely nickeled.

If your dealer does not have them send $1.00 to

A. W. HIGHT, Sta. C., Toledo, O., or W. B. Colp, Ballard, Wash.

SASH CHAIN

CABLE CHAIN

JACK CHAIN

The SMITH & EGGE MFG. CO.
Bridgeport, Conn.

Manufacturers of "Giant Metal" Sash Chains
" " "Red Metal" " "

Cable Chains, Jack Chain, Bell Hangers' Chains and Plumbers' Chains
Made in Brass, Copper and Steel

WRITE FOR CATALOGUES AND PRICES

We are the ORIGINATORS of SASH CHAIN as a SUBSTITUTE for sash cord

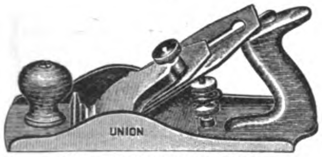
---

BUY . . . . LUMBER DIRECT

WE MANUFACTURE ALL KINDS.—MOULDINGS, WINDOWS DOORS, BLINDS. MIXED CARS, INCLUDING EVERYTHING FOR A BUILDING. STRAIGHT CAR-LOADS SHINGLES, SIDING, FLOORING, WHITE PINE, AT WHOLESALE PRICE.

"Our complete Catalog and Price List of all kinds of Building Material would be a great help to you in figuring."

LESTERSHIRE LUMBER & BOX CO., LESTERSHIRE & BINGHAMTON, NEW YORK.

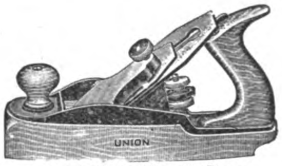


Union X4 Iron Smooth Plane.

THE GOOD WORKMAN DEMANDS

GOOD TOOLS

UNION "X" PLANES



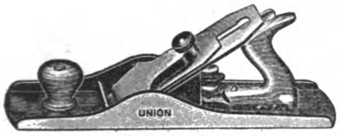
Union X85 Wood Smooth Plane.

Supply that demand, and it is not difficult to convince the Good Workmen of the Country that they are the Planes they want. They are rigid and solid, easy of adjustment, but a Plane that will "stay set" when adjusted.

A FIRST-CLASS PLANE

The cutters are of heavy steel and the same thickness throughout. This feature, together with the solid Frog, make a Plane that WILL PLANE. Every essential feature of it is right, and properly designed, and properly made.

Send for our No. 5 Catalogue, which shows the full line of Planes, Scrapers, etc, etc.
It will interest you.



Union No. X5 Iron Jack Plane.

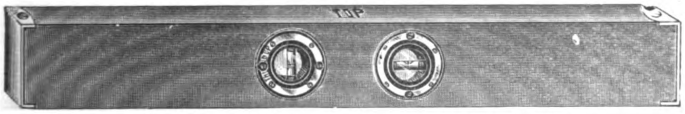
Union Manufacturing Co.,
NEW BRITAIN, CONN., U. S. A.
WAREHOUSE: 103 Chambers St., New York.

Union No. X36 Wood Jack Plane.

THE AKRON ECLIPSE LEVELS Manufactured by The BAKER McMILLEN CO.
AKRON, OHIO.

We have a proposition that will interest every carpenter. Drop us a postal and we will send it to you.

COOK'S LEVEL



For Carpenters, Machinists, Masons.

MADE OF WOOD, IRON, ALUMINUM.

Of all Dealers, or Catalogue on Request.

EVERY LEVEL WARRANTED.

DAVIS & COOK, Watertown, N. Y.

WORTHLEY'S
PATENT

SLOW FEED MANGER

17-Inch Size, $1.60 each.

U are welcome to a copy of our
VANE CATALOGUE

BROAD GAUGE IRON STALL WORKS,
53 Elm St., Boston, Mass.

FAR AHEAD for smooth, easy work and holding edge, will be YOUR VERDICT ON TRYING

CHAPLIN'S IMPROVED PLANES

Patented Feb. 14, 1899; Oct. 30, 1900; Dec. 24, 1902.

We want you to have a copy of our booklet, just issued,

"A 'PLANE' TALK ABOUT A GOOD PLANE!"

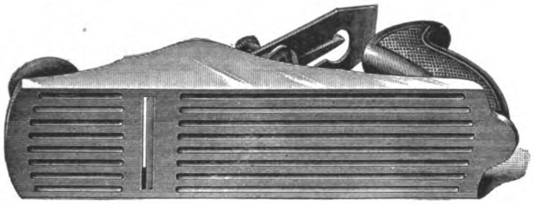
We want you to have a copy, for it is a booklet you really need in your business.

We'll gladly send you this booklet with our compliments, promptly upon receipt of your request.

May we send you a copy?

TOWER & LYON COMPANY,
95 CHAMBERS STREET, NEW YORK.

We Invite the



Severest Comparative Tests.

Forest City Bit & Tool Co., Rockford, Ill., U.S.A.

Manufacturers of Wood Boring Bits, Hollow Mortising Chisels, Common Mortising Chisels and Tools
Send for CATALOG "G" Send for

IF you are interested in the question of good plumbing get the new book

Plumbing and House Drainage Problems

The Sixth Edition, Revised and Enlarged.

All phases of Plumbing, Drainage and Water Supply are expertly treated.

309 Pages, 197 Illustrations.

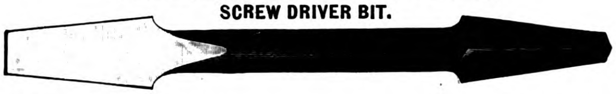
TWO DOLLARS, PREPAID.

DAVID WILLIAMS COMPANY,
14-16 Park Place, New York.

DEMAND and be sure to get

THE VICTOR

SCREW DRIVER BIT.



It is the Best that money can buy. Each one carefully hardened and tempered by itself. Examined, Tested and *Guaranteed Perfect.*

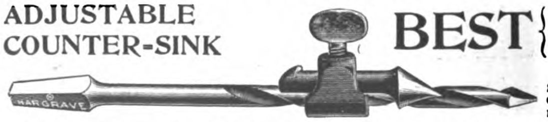
Drop Forged in assorted sizes.

KRAEUTER & CO.,
NEWARK, N. J.

HARGRAVE'S TOOLS

HARGRAVE'S
ADJUSTABLE COUNTER-SINK

BEST { QUALITY FINISH DESIGN



Specify these goods to your dealer and take no other.

This tool fits any double-cut bit from ⅛ to ¼ inch. It is made of cast steel, well tempered, and by its use the counter-sinking and boring can be done at the same time. It also acts as a gauge.

Write for Cat. No. 200

The Cincinnati Tool Co.
Norwood, Cincinnati, O.

THE NEW BOOK

"Strength of Beams, Floors and Roofs"

Makes easy the Designing and Figuring of Wooden Beams and Trusses.

TWO DOLLARS, PREPAID.

DAVID WILLIAMS COMPANY, Publishers, 14-16 Park Place, New York.

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Something to be Proud of

LOTS AND LOTS OF INSTITUTIONS

Purchasing Agents for U. S. Army.
Purchasing Agents for U. S. Navy.
Many others we haven't space for have adopted

This book as their standard on Wood Working Tools, Machinery and Supplies.

And They All Agree On

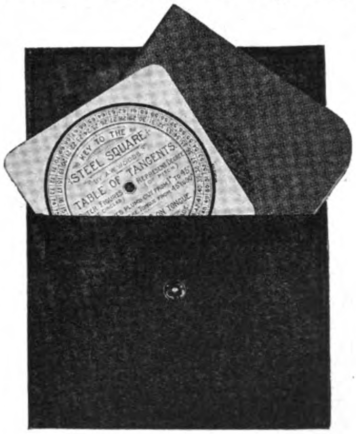
THIS BOOK

As their authority on Metal Working Tools, Machinery and Supplies. If you haven't them—most everybody has—send 25 cents apiece for them and we will send promptly.

The Chas. A. Strelinger Co.,

Box B. **DETROIT, MICH.**

KEY TO THE STEEL SQUARE



THIS IS IT. The Key, Book of Instruction and Morocco Case. Full Size 4x5 inches.

It tells the whole story of how to use the common steel square for all kinds of framing.

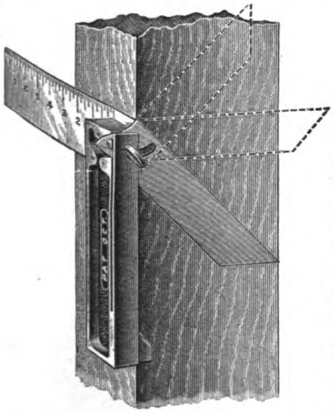
Ask your hardware dealer to see it. If he has not got it, send **$1.50** to

ALFRED W. WOODS,

LINCOLN, NEB. - CHICAGO

SOMETHING NEW

Ideal Bevel Try Square



By having this combination try square you save time, also the price of one tool. You can see by cut how easy it is to change the bevel blade to any desired position to make the square and bevel cut with one stroke of the pencil.

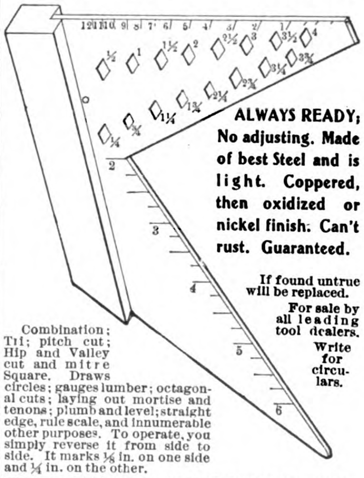
NICHOLLS MFG. CO., OTTUMWA, IOWA.

The New Universal Square

"NEW STYLE"

Made in Three Sizes:

No. 6—6 in. No. 10—10 in. No. 13—13 in.



ALWAYS READY; No adjusting. Made of best Steel and is light. Coppered, then oxidized or nickel finish. Can't rust. Guaranteed.

If found untrue will be replaced.

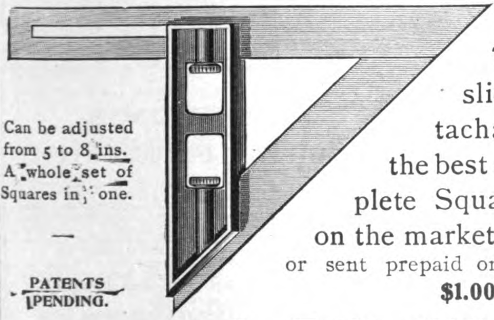
For sale by all leading tool dealers.

Write for circulars.

Combination; Tri; pitch cut; Hip and Valley cut and mitre Square. Draws circles; gauges lumber; octagonal cuts; laying out mortise and tenons; plumb and level; straight edge, rule scale, and innumerable other purposes. To operate, you simply reverse it from side to side. It marks ⅛ in. on one side and ¼ in. on the other.

THE DUBY & SHINN MFG. CO.,
INCORPORATED.
Office and Works, 34 E. 29th St., New York City.

The Fox Square and Miter Improved



Can be adjusted from 5 to 8 ins. A whole set of Squares in one.

PATENTS PENDING.

This tool with sliding and detachable blades is the best and most complete Square and Miter on the market. Of your dealer or sent prepaid on receipt of price, **$1.00.**

P. L. FOX, M'f'r,

432 William Street - - BRIDGEPORT, CONN.

ARCHITECTURAL DRAFTSMEN

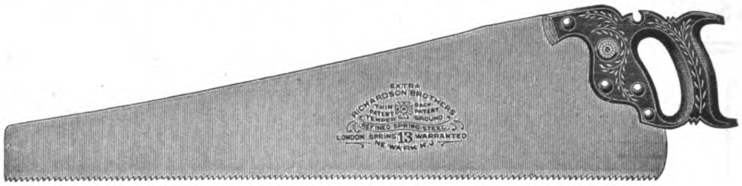
Young men desiring to fit themselves for paying positions as Architectural Draftsmen should fill out and send this advertisement to us to-day and receive our 200 page handbook (FREE) describing our Architectural Drafting course and over 60 others, including Architecture, Architectural Engineering, Contractors' and Builders' course, Carpenters' course, Electrical, Mechanical, Steam and Civil Engineering, Heating, Ventilation and Plumbing, etc.

American School of Correspondence
Chicago, Ill.

Name..
Address..
City and State..

C. & B. 4-06

OLD RELIABLE RICHARDSON SAWS.

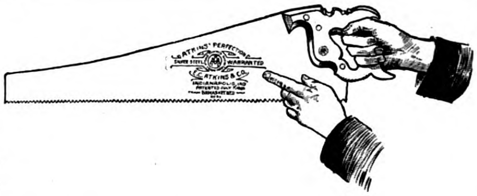


ESTABLISHED 1860.

The peer of them all. Try one and be convinced. Every saw fully warranted.

NATIONAL SAW CO. Operating Richardson Bros. **NEWARK, N. J.**

There's the Saw



Made of SILVER STEEL—will hold its keen cutting edge longer without refiling. Taper ground and balanced just right, it will do its work easily and well. Ask your Dealer for

ATKINS HIGH GRADE SILVER STEEL SAWS

"Finest on Earth."

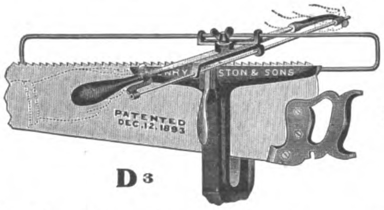
Write for Universal Time Book and Hand Saw Booklet.

E. C. ATKINS & CO., Inc. : **Home Office and Factory, Indianapolis, U. S. A.**

DISSTON Filing Guide and Clamp.

Especially Designed to assist those not skilled in the art to file a saw correctly.

IT'S PRACTICAL
SEND FOR
DESCRIPTIVE
CIRCULAR.



D 3

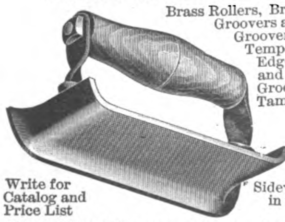
THIS GUIDE IS
FITTED TO THE
DISSTON Nos. 2 and 3
CLAMPS.

HENRY DISSTON & SONS, INC.,

KEYSTONE SAW, TOOL, STEEL & FILE WORKS,

PHILADELPHIA, PA.

Try "Best" Spring Tempered Steel Edge Groovers and Center Groovers

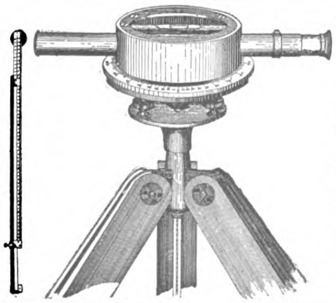


Brass Rollers, Bronze Edge Groovers and Center Groovers, Spring Tempered Steel Edge Groovers and Center Groovers, Iron Tampers, etc.

The Most Satisfactory Cement Sidewalk Tools in the World

Write for Catalog and Price List

The Woodhouse Hdw. Mfg. Co.
2620 So. 13th St. St. Louis Mo.



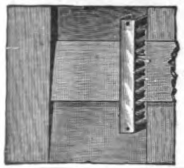
WHAT BUILDERS HAVE BEEN LOOKING FOR

BOSTROM'S

Improved Builders' Level

An absolutely reliable leveling instrument for Architects, Builders, Carpenters, and Stone Masons. Can be used for any kind of foundation work and getting angles, is simple in its construction, easily understood, and can be operated by any one. Is made of Brass, oxidized, and has a silvered circle of degrees. Has achromatic Telescope of ample power for such work. Price, including Plumb Bob, Tripod and Graduated Rod and Target, $20.00. Write for circular and be convinced. Every instrument guaranteed.

BOSTROM-BRADY M'F'G CO.,
53½ West Alabama Street,
Atlanta, Ga.



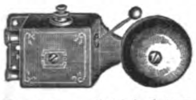
NEW
CLAP-BOARD MARKER.
Cheaper and better than any on the market.

Countersink and Depth Gauge.

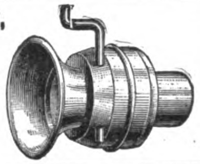
Send for circulars, or ask your Hardware Dealer for them.
OTIS A. SMITH, Rockfall, Conn.

An Instant Cure For Slipping Belts!
DIXON'S
SOLID BELT DRESSING.
WRITE FOR A FREE SAMPLE.
JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

W. R. OSTRANDER & CO., 22 Dey Street, New York City,



Manufacturers of
Speaking Tubes, Whistles, Elevator,
House and Hotel Annunciators and Bells,
Electric Light Supplies.
Send for Catalogue.



Factory, 1431-1439 DeKalb Avenue, Brooklyn.

"Yankee" Tools.

No. 11.—RATCHET, RIGHT AND LEFT HAND AND RIGID.

No. 15.—RATCHET, WITH FINGER TURN ON BLADE.

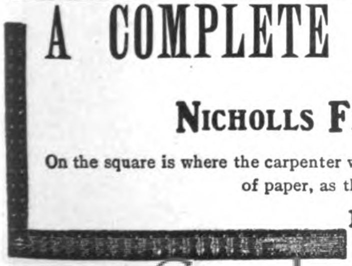
No. 30.—SPIRAL RATCHET, RIGHT AND LEFT HAND AND RIGID.

The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up to date mechanic could buy tools of their quality and character. Other tools are very good tools, but "Yankee" Tools are better. "Yankee" Tools are sold by all leading dealers in Tools and Hardware. Ask your dealer to see them. Our Yankee Tool Book tells all about them. Sent free by

NORTH BROS. MFG. CO., Philadelphia, Pa.

A TOOL THAT'S STAMPED
STANLEY
IS THE BEST OF IT'S KIND

IMPROVED CARPENTERS' TOOLS
Sold by all Hardware Dealers
Stanley Rule and Level Co.
NEW BRITAIN, CONN., U. S. A.



A COMPLETE FRAMING RULE
ON
NICHOLLS FRAMING SQUARE.

On the square is where the carpenter wants his figures, not in a book or on a piece of paper, as they are usually lost.

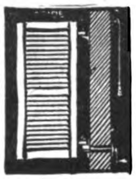
NICHOLLS MFG. CO.,
OTTUMWA, IOWA.

We have now ready our
New Illustrated Catalogue No. 19
devoted exclusively to
Wood Workers' Tools

Containing **250** pages, **1100** illustrations, handsomely printed on good paper, it makes a convenient and valuable book for **all woodworking mechanics.**
Sent to any address on receipt of 10 cents postage.

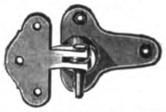
WM. P. WALTER'S SONS,
TOOL HEADQUARTERS
1233 Market St., Philadelphia.

Mallory Shutter Worker.
Works and locks the blinds from the inside. Ornamental, durable, perfect working. Applicable to old or new buildings.
Manufactured by
MALLORY MFG. CO.,
Flemington, N. J.



Automatic Blind Hinges

HALE & BENJAMIN'S PATENT



Flush and surface for wood and brick building. Easy to put on, strong and durable. **Warranted.** Also combination awning hinges. With these hinges blinds will not slam or blow off. They are the only hinges adapted to bay or mullion windows, as they require no other fixtures. Testimonials on request from dealers, contractors, and people who have used them several years. We are the sole owners of these two patents. If your dealer does not keep them write to

PARKER WIRE GOODS COMPANY,
Manufacturers,
No. 1 Assonet Street, Worcester, Mass.

Use Our
Folding and Adjustable
Handle Draw Knife!

It is adjustable to any position, adaptable to the awkward places, absolutely rigid when set, handy and compact, a time saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

Write for Prices and Discounts.

A. J. WILKINSON & CO.,
180-188 Washington St., Boston, Mass., U.S.A.

The Rich Handy Drawing Outfit
Saves Time
for the draughtsman, and is a great aid to the learner. It holds a number of sheets or a pad, which requires no fastenings. **The Protractor T Square** gives accurate angles. You get measurements direct from the board. Has a drawer for instruments, and can be carried around to make drawings on the spot. Circulars free.

J. & G. RICH, 122 N. 6th St., Phila., Pa.

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Send for Catalogue No. 62

Giving description of books on Architecture, Building, Engineering and allied subjects. Sample of "Architects & Builders Magazine" sent on request.

Published monthly at $2.00 a year.
Foreign Subscriptions, $3.00 a year.

WM. T. COMSTOCK, Pub., 23 Warren Street, N.Y.

THE STANDARD

for over forty years. **Frink's Reflectors.** All sizes and shapes for every conceivable purpose. State your wants and we can meet them. Investigation means adoption.

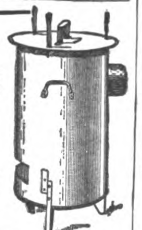
I. P. FRINK, 551 Pearl Street, New York.

A 7½ HAND SAW

This is not a PRIZE but a JEWEL. If your dealer cannot furnish you one of our CELEBRATED NARROW A 7½ HAND SAW, 6 inch at butt, 1½ inch at point, 4 gauges thin on back, send us P. O. Order for $2.00 and we will send, express prepaid, 26 inch SAW in Canvas Scabbard.

C. E. JENNINGS & CO.,
101 Reade Street, NEW YORK.
SOLE MANUFACTURERS.

Plasterer's
DRYING STOVES



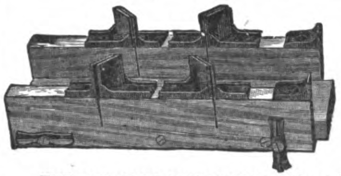
2 sizes
Send for price.

The S. M. Howes Co.,
40-46 Union St.
BOSTON, MASS.

STANDARD FOR 30 YEARS

This name stamped on every three feet is a guarantee that you are getting the best sash cord that can be made.

SILVER LAKE CO.,
Boston, Mass.



Improved Mitre Box 80c.

THE IMPROVED MITRE BOX is without doubt the best and most durable Miter Box made for general work. The frame is made of hard wood, 1 inch thick, has adjustable iron saw guides for any thickness of blade; an ordinary cross cut saw can be used as well as a back saw. At this price it is certainly a bargain and gives you an idea how low our prices are.

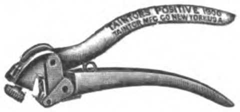
WE MANUFACTURE THE CELEBRATED WIVANCO TOOLS. If you have not already used them begin now and you will be surprised at the saving in cost and the satisfaction derived from using tools of high quality. Our 90 years of square business dealings and low prices, together with our regular guarantee of money back on all purchases not satisfactory in every respect, is sufficient reason for giving **OUR CELEBRATED WIVANCO TOOLS** a trial.

OUR NEW 600 PAGE CATALOG NO. 90 gives a full description and prices of our complete line of tools for all trades.

Write for it to-day. **PRICES LOWER THAN EVER.**
Freight and express rates are lower from New York than any other city in America.
Oldest Mail Order House in America. Established 1816.

White, Van Glahn & Co.
14 CHATHAM SQUARE, NEW YORK CITY

TAINTOR Positive Saw Set



TRY IT If you like it tell others
If you don't like it tell US

Send for our circular which contains HINTS on the

CARE of SAWS

Free on application.

TAINTOR MFG. CO.
113 Chambers St., New York

MONARCH Sash Chain

IS THE BEST.

Samples free. Mention this paper.

The Bridgeport Chain Co.
Bridgeport, Conn.

SAMSON SPOT CORD

Distinguished by our trade-mark, the Colored Spot.

Outwears any other device for hanging windows.

SAMSON CORDAGE WORKS, Boston, Mass.

Ask for **MILLERS FALLS CO.'S BIT BRACES**

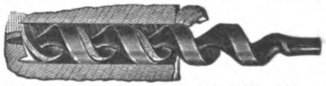
Series Nos.	30	31	32	33
	14	12	10	8 inch sweep.

There are no other braces made which match them in merit and beauty of finish.

Our name appears on all genuine goods. Look for it before you buy. If your dealer does not keep Millers Falls Braces then write to us.

Millers Falls Company
28 Warren Street, New York, N. Y.

THE FORD AUGER BIT



FORD AUGER BIT CO., Holyoke, Mass.

The first and only Bit with Patented Concave Twist. The best Bit for all round work yet produced. It is worth your time to try one and see.

BURLINGTON VENETIAN BLIND CO.
MAKERS OF
BLINDS
AND SCREENS
BURLINGTON, VT.

L. S. Starrett says:

"If you find any tools better than STARRETT TOOLS—buy them."

Send for free Catalogue No. 17 P of the largest line of fine tools made.

The L. S. Starrett Company,
Athol, Mass., U. S. A.

Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

VOL. XXVIII. NO. 5. NEW YORK, MAY, 1906. Ten Cents a Copy. One Dollar a Year.

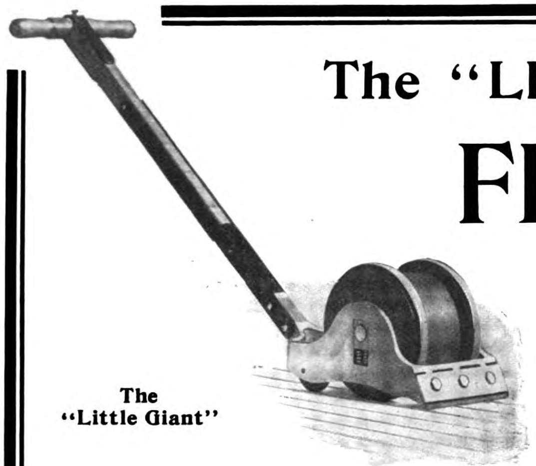
Alphabetical List of Advertisers.

American Column Co.	55
American Rolling Mill Co.	11
American Wood Working Machinery Co.	6
Asphalt Ready Roofing Co.	1
Atkins, E. C. & Co.	66
Baker McMillen Co.	63
Barnes, W. F. & John Co.	4
Barnes Tool Co.	8
Barnett, G. & H., Co.	1
Batavia Clamp Co.	59
Berger Mfg. Co.	10
Bommer Bros.	1
Boston Bolt Co.	9
Bostrom-Brady Mfg. Co.	66
Boynton Furnace Co.	18
Bracket Hook Co.	9
Bradt Pub. Co.	13
Bridgeport Chain Co.	68
Broad Gauge Iron Stall Wks.	63
Burlington Venetian Blind Co.	68
Burritt, A. W. Co.	57
Cabot, Samuel	1
Caldwell Mfg. Co.	63
Canton Steel Roofing Co.	11
Cement Machinery Co.	8
Chattanooga Roofing & Fdy. Co.	51
Chicago Machinery Exchange	7
Cincinnati Tool Co.	64
Cleveland Stone Co.	59
Columbia Mineral Wool Co.	18
Comstock, Wm. T.	68
Cordesman, Meyer & Co.	10
Cortright Metal Rfg. Co.	13
Crescent Machine Co.	8
Danforth, A. H.	11
Davis & Cook	63
Diamond Expansion Bolt Co	8
Disston, Henry & Sons	66
Dixon, Jos., Crucible Co.	67
Drouve, G. Co.	11
Duby & Shinn	65
Dunn, Fred W., Co.	9
Eastern Granite Roofing Co.	14
Edwards Mfg. Co.	10
Eller Mfg. Co.	14
Energy Elevator Co.	17
Enterprise Fdry. Co.	6
Fay, J. A. & Egan Co.	5
Floyd, Wells Co.	60
Ford Auger Bit Co.	68
Forest City Bit & Tool Co.	65
Foster Munger Co	58
Fox Machine Co.	10
Fox, P. L.	65
French, Samuel H. & Co.	17
Frink, I. P.	68
Gage Tool Co.	18
Globe Ventilator Co.	17
Goodell Mfg. Co.	63
Grand Rapids Hdw. Co.	58
Grand Rapids Wood Carving Co.	59
Grinnell Publishing Co.	14
Hamlin, George R.	11
Hammacher, Schlemmer & Co.	62
Hartmann Bros. Mfg. Co.	58
Hess Warming & Ventilating Co.	60
Hight, A. W.	64
Hood Furnace & Supply Co.	61
Howes, S. M., Co.	68
Hurley Machine Co.	3
Ideal Concrete Machinery Co.	7
Ideal Ventilator Co.	59
Interior Hardwood Co.	1
International Cor. Schools	8
International Heater Co.	61
Ives, Hobart B. & Co.	60
Jennings, C. E. Co.	68
Johnson, E. J., Co	14
Johnson, S. C., & Son	57
"Joinery"	51
Kanneberg Rfg. & Ceil. Co.	14
Karol, B. C.	13
Kees, F. D. Mfg. Co.	59
Keighley, S. Metal Ceiling & Mfg. Co.	13
Kidder, R. E.	9
Kimball Bros. Co.	17
King Mantel Co.	58
King Mfg. Co.	59
Kinnear & Gager Co.	9
Kraeuter & Co.	64
Lanz, M., & Sons	9
Lane Bros. Co.	59
Leavitt Machine Co.	63
Lestershire Lumber & Box Co	17
Long Island Machinery Co.	5
Lord & Burnham Co.	12
Lorenzen, Chas. F. & Co.	56
McLain, F. C., Co.	61
Mallory Mfg. Co.	67
Marston, J. M. & Co.	5
Mesker & Bro.	15
Meyers, F. J. Mfg. Co.	9
Miller, A. W., Mfg. Co.	18
Millers Falls Co.	68
Montross Metal Shingle Co.	11
Morse, Williams & Co.	17
Morton, Thomas	58
Mullins, W. H. Co.	13
National Mfg. Co.	59
National Saw Co.	66
Nat'l Sheet Metal Rfg. Co.	15
New Jersey Zinc Co.	15
N. Y. Steel Corner Plate Co.	15
Nicholls Mfg. Co.	65&67
North Bros. Mfg. Co.	67
O. K. Harry Steel Wks.	5
Ostendorf, W. H.	59
Ostrander, W. R. & Co.	67
Parker Wire Goods Co.	67
Parks Ball Bearing Machinery Co.	5
Pettyjohn Co.	6
Phila. & Boston Face Brick Co.	18
Pike Mfg. Co.	1
Progressive Mfg. Co.	62
Reed & Auerbacher Co.	18
Rehm Hardware Co.	63
Rich, J. & G.	67
Richards Mfg. Co.	60
Sackmann, F. A.	5
Samson Cordage Works	68
Schaller-Hoerr Co.	55
Scott & Co.	11
Sedgwick Mch. Works	17
Seneca Falls Mfg. Co.	4
Shimer, Samuel J. & Sons	8
Silver Lake Co.	68
Simonds Mfg. Co.	18
Smith, Otis A.	67
Smith & Egge Mfg. Co.	63
Standard Paint Co.	10
Stanley Rule & Level Co.	67
Stanley Works	1
Star Encaustic Tile Co.	11
Starrett, L. S. Co.	1&68
Stowell Mfg. Co.	12
Strelinger, C. A. Co.	65
Taintor Mfg. Co.	68
Topp, G. A. & Co.	12
Tower & Lyon	62
Truss Metal Lath Co	17
Tubular Heating & Ventilating Co	61
Union Mfg. Co.	64
U. S. Mineral Wool Co.	18
Van Dorn Iron Wks. Co.	5
Waddell Mfg. Co.	58
Wagner Mfg. Co.	11
Walters, Wm. P. Sons	67
Warner Elevator Mfg. Co.	17
Washburne, E. G. & Co.	8
Wheeling Corrugating Co.	12
White, Van Glahn & Co.	68
Wilkinson, A. J. & Co.	67
Willis Mfg. Co.	13
Woodhouse Hdw. Mfg. Co.	66
Wood-Mosaic Flooring Co.	18
Woods, A. W.	65
Yale & Towne Mfg. Co.	60

Classified List of Advertisers.

Annunciators
Ostrander, W. R. & Co.
Architects' Details
Lestershire Lumber & Box Co.
Asbestos
Stowell Mfg. Co.
Auger Bits
Ford Auger Bit Co.
Jennings, C. E. Co.
Awnings
Chattanooga Roofing & Fdry. Co.
O. K. Harry Steel Works
Band Saws
American Wood Working Machinery Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Crescent Machine Co.
Fay, J. A. & Egan Co.
Barrel Swings
Leavitt Machine Co.
Blackboards, Slate
Johnson, E. J. Co.
Blinds
Burlington Venetian Blind Co.
Foster-Munger Co.
Schaller-Hoerr Co.
Blind Hinges
Parker Wire Goods Co.
Stanley Works
Bolts and Nuts
Boston Bolt Co.
Books
Arthur, Wm.
Bradt Pub. Co.
Comstock, Wm. T.
Grinnell Pub. Co.
Hood Fce. & Sup. Co.
Williams, David, Co.
Boring Machines
Fox Machine Co.
Millers Falls Co.
Bracket Hangers
Wagner Mfg. Co.
Brackets, Building, Folding
Danforth, A. H.
Brick Machinery
Cement Machinery Co.
Builders' Hardware
Boston Bolt Co.
Hammacher, Schlemmer & Co.
Rehm Hardware Co.
Yale & Towne Mfg. Co.
Building, Brackets, Folding
Danforth, A. H.
Stanley Works
Tower & Lyon Co.
Building Material
Lestershire Lumber & Box Co.
Building Paper and Felt
Cabot, Samuel.
Standard Paint Co.
Builders' Supplies
Schaller-Hoerr Co.
Butts and Hinges
Stanley Works.
Capitals
Grand Rapids Wood Carving Co.
Waddell Mfg. Co.
Ceiling, Metallic
Berger Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Keighley, S. Metal Ceiling & Mfg. Co.
Kinnear & Gager Co.
Wheeling Corrugating Co.
Willis Mfg. Co.
Cement
French, S. H. & Co.
Cisterns, Steel
O. K. Harry Steel Works.
Clamps
Batavia Clamp Co.
Cincinnati Tool Co.
Concrete Block Machines, Portable
Cement Machinery Co.
Enterprise Fdry. Co.
Ideal Concrete Machinery Co.
Pettyjohn Co.
Conductor Pipes
American Rolling Mill.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Conservatories
Lord & Burnham Co.
Contractors' Supplies
Boston Bolt Co.
Cornices, Sheet Metal
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mesker & Bro.
Mullins, W. H. Co.
Willis Mfg. Co.
Cresting
Van Dorn Iron Works Co.
Willis Mfg. Co.
Cutter Heads
Shimer, Sam'l J. & Sons.
Designs and Details
(See House Plans)
Door Checks and Springs
Hammacher, Schlemmer & Co.
Door Hangers
Lane Bros. Co.
National Mfg. Co.
Draw Knives
Wilkinson, A. J. & Co.
Drawing Instruction
International Correspondence Schools.
Drawing Outfits
Comstock, Wm. T.
Rich, J. & G.
Drying Stoves
Drouve, G. Co.
Howes, S. M. Co.
Dumb Waiter Fixtures
Hammacher, Schlemmer & Co.
Eave Troughs
Chattanooga Roofing & Fdry. Co.
Eller Mfg. Co.
Wheeling Corrugating Co.
Elevators and Dumb Waiters
Energy Elevator Co.
Kimball Bros. Co.
Meyers, F. J. Mfg. Co.
Morse, Williams & Co.
Sedgwick Machine Works.
Warner Elevator Mfg. Co.
Etching Fluid
Reed & Auerbacher Co.
Expansion Bolts
Boston Bolt Co.
Diamond Expansion Bolt Co.
Fencing
O. K. Harry Steel Works.
Files and Rasps
Barnet, G. & H. Co.
Boston Bolt Co:
Floor Scrapers
Hurley Machine Co.
Framing Tools
Topp, G. A., & Co.
Furnaces and Heaters
Boynton Furnace Co.
Floyd-Wells Co.
Hess Warming & Ventilating Co.
Hood Fce. & Sup. Co.
International Heater Co.
Tubular Heating & Ventilating Co.
Gas and Electric Fixtures
Frink, I. P.
Grates
King Mantel Co.
Grates, Fancy Plated
Chattanooga Roofing & Fdry. Co.
Gravity Mixers
Dunn, F. W., Co.
Greenhouses
Lord & Burnham Co.
Grille Work, Wood
Foster-Munger Co.
Waddell Mfg. Co.
Grindstones
Cleveland Stone Co.
Richards Mfg. Co.
Grooving Heads
Fox Machine Co.
Hangers, Barn Door
Richards Mfg. Co.
Hangers, House Door
Richards Mfg. Co.
Hardware Jobbers
White, Van Glahn & Co.
Hardware Specialties
Richards Mfg. Co.
Hasps, Hooks and Staples
Woodhouse Hdw. Mfg. Co.
Heaters.—*Steam and Hot Water.*
International Heater Co.
Lord & Burnham Co.
Heaters, Steam and Gas Combined
McLain, Frank C. & Co.
Hinges, Spring
Bommer Bros.
Hinges, Window Screen
Kees, F. D. Mfg. Co.
House Plans
Comstock, Wm. T.
Iron House Fronts
Mesker & Bro.
Iron Work
Van Dorn Iron Works Co.
Joist Hangers
Lanz, M. & Sons.
Lath, Metal
Truss Metal Lath Co.
Wheeling Corrugating Co.
Levels
Baker, McMillen Co.
Bostrom-Brady Mfg. Co.
Davis & Cook.
Lightning Rods
Washburn, E. G. & Co.
Locks
Rehm Hardware Co.
Yale & Towne Mfg. Co.
Lumber and Shingles
Lestershire Lumber & Box Co.
Mangers, Slow Feed
Broad Gauge Iron Stall Works.
Mantels
Burritt, A. W., Co.
Foster-Munger Co.
French, Sam'l H. & Co.
King Mantel Co.
Lorenzen, C. F. & Co.
Ostendorf, W. H.
Phila. & Boston Face Brick Co.
Masons' Stoves
Drouve, G. Co.
Metal Lath
Truss Metal Lath Co.
Mill Work
Schaller-Hoerr Co.
Mineral Wool
Columbia Mineral Wool Co.
U. S. Mineral Wool Co.
Miter Boxes
Goodell Mfg. Co.
Nicholls Mfg. Co.
Miter Machines
Fox Machine Co.
Miters
Fox, P. L.
Mixers, Gravity
Dunn, F. W., Co.
Moldings
American Column Co.
Grand Rapids Wood Carving Co.
Schaller-Hoerr Co.
Waddell Mfg. Co.
Mortar Colors
French, Sam'l H. & Co.
Mortisers, Hand
Miller, Albert W., Mfg. Co.
Ornamental Sheet Metal Work
Mullins, W. H. Co.
Ornamental Wire, Iron, Steel and Brass Work
Meyers, F. J. Mfg. Co.
Paint
New Jersey Zinc Co.
Standard Paint Co.
Parquette Flooring
Interior Hardwood Co.
Johnson, S. C., & Son.
Wood-Mosaic Flooring Co.
Patent Lawyers
Hamlin, George R.
Pencils
Dixon, Jos. Crucible Co.
Planes
Gage Tool Co.
Smith, Otis A.
Tower & Lyon Co.
Union Mfg. Co.
Plasterers' Corner Plates
New York Steel Corner Plate. Co.
Plastic Ornaments
French, Samuel H. & Co.
Plumbers' Supplies
Karol, B. C.
Porch Columns
American Column Co.
Hartman Bros. Mfg. Co.
Post and Mining Machinery
Cement Machinery Co.
Reflectors
Frink, I. P.
Roof Brackets
Wagner Mfg. Co.
Roofing, Art Metal Tile
Mullins, W. H. Co.
Roofing and Siding
Asphalt Ready Roofing Co.
Berger Mfg. Co.
Canton Steel Roofing Co.
Drouve, G. Co.
Eastern Granite Roofing Co.
Edwards Mfg. Co.
Eller Mfg. Co
Kanneberg Roofing & Ceiling Co.
Lincoln Waterproof Cloth Co.
O. K. Harry Steel Works.
Scott & Co.
Standard Paint Co.
Stowell Mfg. Co.
Wheeling Corrugating Co.
Roofing Brackets
Stanley Rule & Level Co.
Roofing Paint
Asphalt Ready Roofing Co.
Dixon, Jos. Crucible Co.
Roofing Slate
Johnson, E. J. Co.
Sash Balances
Caldwell Mfg. Co.
Sash Chains
Bridgeport Chain Co.
Morton, Thomas.
Smith & Egge Mfg. Co.
Sash Cord
Samson Cordage Works.
Silver Lake Co.
Sash Locks
Ives, H. B. & Co.
Sash Operating Devices
Lord & Burnham Co.
Sash Pulleys
Grand Rapids Hardware Co.
Sashes, Doors and Blinds
Foster-Munger Co.
Lestershire Lumber & Box Co.
Saw Clamps
Disston, Henry & Sons.
Saw Filing Guide
Disston, Henry & Sons.
Saw Jointers
Crescent Machine Co.
Saw Sets
Taintor Mfg. Co.
Saw Tables
Chicago Machinery Exchange.
Crescent Machine Co.
Kidder, R. E.
Saws
Atkins, E. C. & Co.
Disston, Henry & Sons.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
National Saw Co.
Simonds Mfg. Co.
Scaffold Brackets
Bracket Hook Co.
Wagner Mfg. Co.
Schools
International Correspondence Schools.
Screw Drivers
Kraeuter & Co.
North Bros. Mfg. Co.
Sheet Metal Fronts
Mesker & Bro.
Shingles and Tiles, Metallic
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Cortright Metal Roofing Co.
Montross Metal Shingle Co.
National Sheet Metal Roofing Co.
Willis Mfg. Co.
Shingles Hip
Wheeling Corrugating Co
Shingle Stains
Cabot, Samuel.
Shutter Worker
Mallory Mfg. Co.
Shutters (See Blinds)
Skylights
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Drouve, G. Co.
Edwards Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mullins, W. H. Co.
Willis Mfg. Co.
Speaking Tubes
Ostrander, W. R. & Co.
Spring Hinges
Bommer Bros.
Squares
Duby & Shinn.
Fox, P. L.
Nicholls Mfg. Co.
Squares, Combination
Hight, A. W., Toledo, O.
Steel Figures and Letters
Sackman, F. A.
Steel Square Key
Woods, Alfred W.
Stoves and Ranges
Boynton Furnace Co.
Structural Iron and Steel Works
Boston Bolt Co.
Structural Slate
Johnson, E. J. Co.
Tanks, Steel
O. K. Harry Steel Works.
Tiling
King Mantel Co.
Ostendorf, W. H.
Star Encaustic Tile Co.
Tool Boxes
Walter's Sons, W. P.
Tool Cabinets
Hammacher, Schlemmer & Co
Tool Chests
Jennings, C. E. Co.
Tools
Forest City Bit & Tool Co.
Gage Tool Co.
Hammacher, Schlemmer & Co
Jennings, C. E. Co.
Kraeuter & Co.
Millers Falls Co.
North Bros. Mfg. Co.
Progressive Mfg. Co.
Reed & Auerbacher Co.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S., Co.
Strelinger, C. A., Co.
Tower & Lyon Co.
Walter's Sons, Wm. P.
Wilkinson, A. J., & Co.
Turned, Molded Carved Work
Waddell Mfg. Co.
Ventilating Attachment
Drouve, G., Co.
Ventilators
Globe Ventilator Co.
Ventilators, Window
Ideal Ventilator Co.
Veranda Stock
American Column Co.
Vises
Hammacher, Schlemmer & Co
Wagon Jacks
Batavia Clamp Co.
Wax, Finishing and Polishing
Johnson, S. C., & Son.
Weather Strips
Hammacher, Schlemmer & Co
King Mfg. Co.
Weather Vanes
Broad Gauge Iron Stall Works.
Window Apparatus
Drouve, G. Co.
Window and Door Stops
King Mfg. Co.
Window Fasteners
Stanley Works.
Window Stop Adjusters
Ives, Hobart B., & Co.
Window Trimmings
Caldwell Mfg. Co.
Windows, Fireproof
Mullins, W. H. Co.
Wood Carving
Grand Rapids Wood Carving Co.
Wood Mantels
(See Mantels)
Wood Ornaments
Waddell Mfg. Co.
Wood Trimmers
Fox Machine Co.
Wood Working
Lestershire Lumber & Box Co.
Wood Working Machinery
American Wood Working Mach'y Co.
Barnes, W. F. & John.
Barnes Tool Co.
Chicago Machinery Exchange.
Cordesman Machine Co.
Fay, J. A. & Egan Co.
Fox Machine Co.
Kidder, R. E.
Long Island Machinery Co.
Marston, J. M. & Co.
Parks Ball Bearing Machinery Co.
Seneca Falls Mfg. Co.
Wood Working Machinery, Second Hand
Long Island Machinery Co.

The "LITTLE GIANT" FLOOR SCRAPER



The "Little Giant"

Easily operated by one man. Saves time, money and laborious work

No motive power required.

We furnish the following:

- 1 Machine Complete
- 1 Dozen Knives
- 1 Filing Clamp
- 1 Wrench
- 1 Burnishing Steel
- 1 Flat Mill File
- 1 Oil Stone

PRICE

$65.00

F.O.B. Chicago or New York

Will get in all CORNERS and right up to the BASE BOARD.

Will pay for itself in a week.

Can be used successfully on

OAK
MAPLE
BIRCH
BEECH
YELLOW PINE
and PARQUET

FLOORS

The Only Way

Construction is simple but durable. The knives are adjustable to provide for the wear. Handle can be adjusted and shortened for work in small rooms. The roller weight and guide wheels have heavy rubber tires and device cannot possibly injure the floor.

The Old Way

Get your order in

NOW

and be assured of prompt delivery.

Hurley Machine Co.
153-159 South Jefferson St.
CHICAGO.

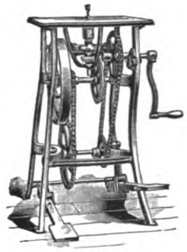
New York Office, 1010 Flatiron Building.

FOOT, HAND AND POWER
WOOD-WORKING MACHINERY

For Carpenters, Builders, Cabinet-Makers and Other Wood-Workers.

"Victor" Scroll Saw.

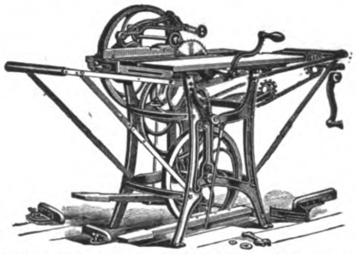
"Diamond" Mortiser.



"Rex" Moulder.

Built for Hard Work, Accurate Work and Long Service.

ONE MAN with one of these machines will do the work of four to six men using hand tools; will do it easier, will do it better.



No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw.

WE GUARANTEE each machine to be thoroughly practical and accurate. Machines sent on trial, and if not found entirely satisfactory may be returned at our expense.

No. 8 "Union" Power Saw.

Enterprising mechanics are quick to see the superior merits of our machines. It will pay you to investigate these advantages.

SEND FOR CATALOG "A."

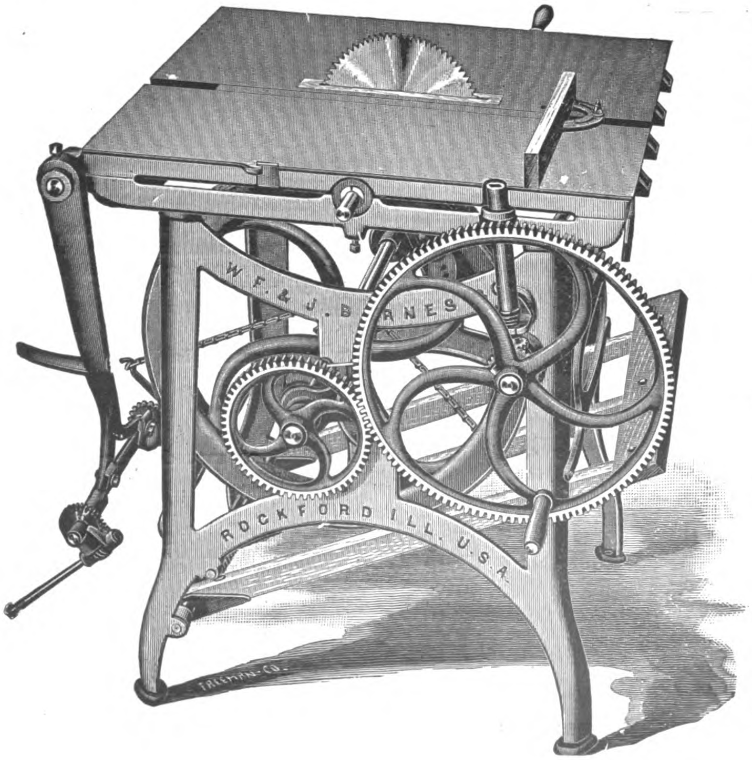
The Seneca Falls Manufacturing Co.

209 Water Street, Seneca Falls, N. Y., U. S. A.

(96)

No. 6 "Union" Combination Saw.

Barnes Foot and Hand Power Machinery



For CARPENTERS and BUILDERS.

Our New Hand and Foot Power Circular Saw No. 4, the strongest, most powerful, and in every way the best machine of its kind ever made for ripping, cross cutting and for grooving, gaining, dadoing and rabbeting. Solid iron table planed perfectly true.

We make nine other machines for Wood Workers.

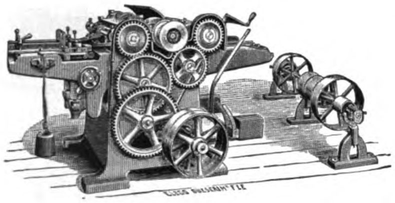
The Only Complete Line of Such Machines made.

Strong,
Practical,
Durable.

Catalogue Free on Application.

W. F. & JOHN BARNES CO.
71 Ruby St., Rockford, Ill.

Instantly changed from a planer and matcher to a surfacer or vice versa



IF you have a limited amount of planing, matching and molding, including both light and heavy work, if your shop is small, if you must have the highest grade of work at all times, you need this combined planer, matcher and molder.

Planes one side up to 24½ inches wide and up to 6 inches thick and matches 12 inches wide. Cuts moldings as deep as 1½ inches.

Descriptive circulars give complete details of all constructive features. Sent free on request. Catalog also if desired.

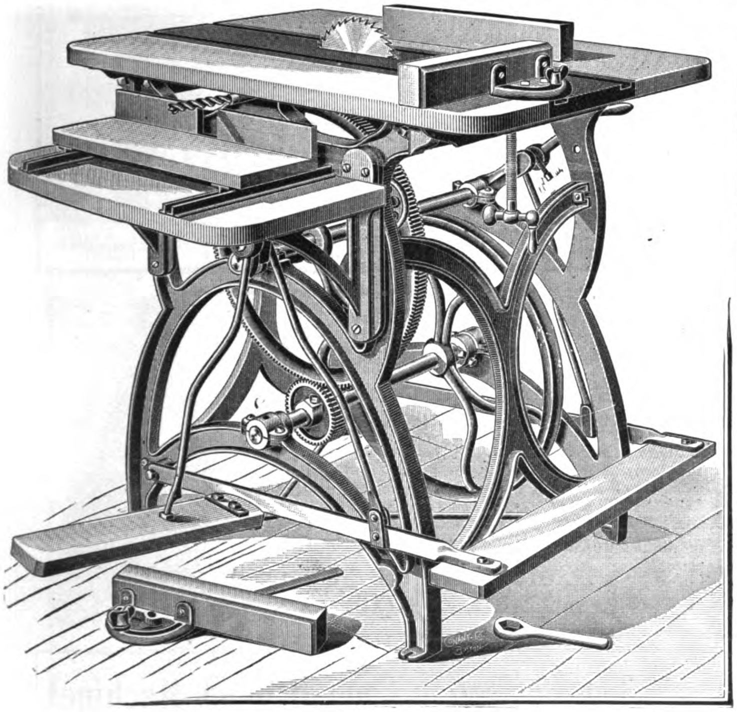
221-241 W. Front St. **Drop a postal to**

Cincinnati, Ohio, U.S.A.

J·A·FAY & EGAN CO·

The World's Standard for Woodworking Machinery.

Marston's Hand and Foot Power Circular Saw.



Iron frame, 36 inches high.
Center part of top is made of iron accurately planed, with grooves on each side of saw for gauges to slide in.
Steel shafts and best babbitt metal boxes.
Gears are all machine-cut from solid iron.
Boring table and side treadle.
Two 7-inch saws and two crank handles with each machine.
Weight complete, 350 pounds.
Send for catalogue.

J. M. MARSTON & CO., 201 Ruggles St., Boston, Mass.

VAN DORN IRON WORKS CO
CLEVELAND, OHIO.
STRUCTURAL STEEL & ORNAMENTAL IRON WORK.
JAIL WORK, JOIST HANGERS, IRON FENCINGS.

SECOND-HAND WOOD WORKING MACHINERY

Woods Moulder 12 in. Matchers 24 in.
Berlin Moulder 15 in. Pony Planers 16, 20, 24 in.
Rogers Moulder 8 in.

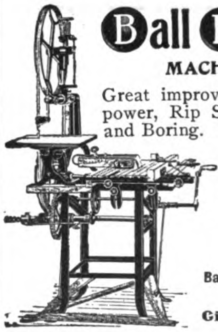
Variety Machines, Double and Single, Jointers, Swing Saws, Rolling Top Saw Tables, Gas and Gasoline Engines, Band Saws, Routers, Sanders, Circular Saws, Jig Saws.

A1 CONDITION. PROMPT DELIVERY.

All Kinds of Machinery Purchased for Cash.

LONG ISLAND MACHINERY CO.
15 Washington Ave., Brooklyn, N. Y.

Ball Bearing
MACHINERY.

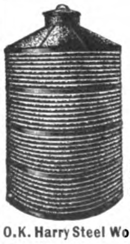


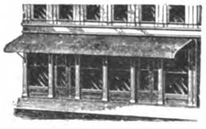
Great improvement for foot power, Rip Saw, Band Saw and Boring. All ready for use, same for power. Other attachments and useful tools.

Manufactured by
PARKS
Ball Bearing Mach. Co.
Sta. A.,
Cincinnati, Ohio

MARK YOUR TOOLS WITH A STEEL STAMP.

F. A. SACKMANN.
61 PROSPECT ST.
CLEVELAND, OHIO.
SEND FOR PRICE-LIST No.7





Harry's Patent Adjustable Steel Drop Awnings.

Harry's Underground Corrugated Galvanized Steel Cisterns and Tanks

Roofing of all kinds, Fencing, etc
Send for catalogue, prices, etc.

O.K. Harry Steel Works, 2341 Papin St., St. Louis, Mo.

—TEACHER: "We should never do in private what we would not do in public."

L'enfant Terrible: "How 'bout taking a bath?"—*Exchange.*

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Considering a Purchase? Investigate Before Deciding

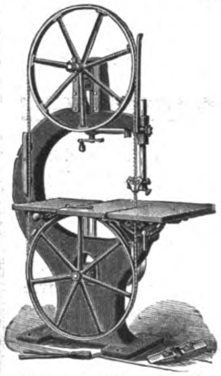


Fig. 514. Clement 36" Band Saw.

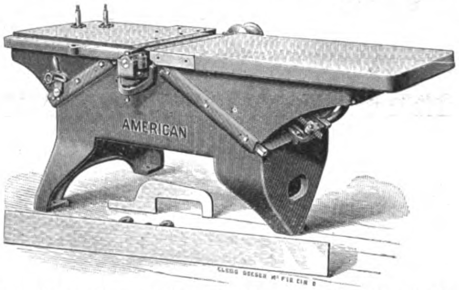


Fig. 800. Clement 8", 12", 16", 20", 24", 30" and 36" Buzz Planers.

Fig. 522. Williamsport Scroll Saw.

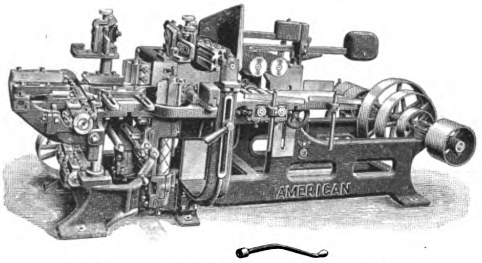


Fig. 8501. American 6" and 8" B Moulder.

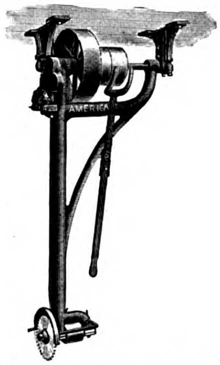


Fig. 610. Houston Swing Saw.

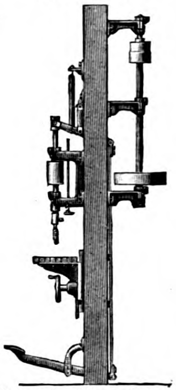


Fig. 976. No. 2 Clement Post Borer.

For Catalogue and Prices address:

American Wood Working Machinery Co.

New York Chicago New Orleans

Portable Hollow Concrete Block Machine

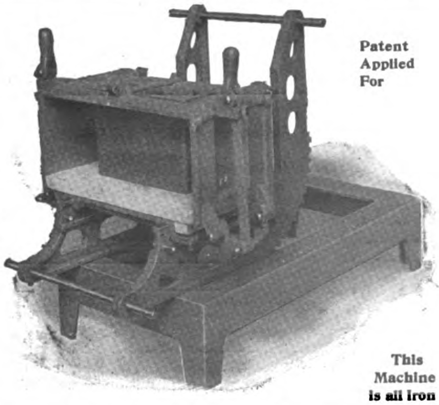
BEST—FASTEST—SIMPLEST—CHEAPEST.

MOVE THE MACHINE—NOT THE BLOCKS

Saves labor of off-bearing, avoids loss by crackage or breakage, saves expense of heavy cumbersome iron pallets. Sand, Water and Portland Cement only materials required. BIG PROFITS. Blocks cost 6 cents to make. Sell for 18 cents. Whole outfit costs $125.00.

FULLY GUARANTEED. SENT ON TRIAL.

THE PETTYJOHN CO., 616 North 6th Street,
TERRE HAUTE, IND.



Patent Applied For

This Machine is all Iron

The Perfection Cement Block Machine

Makes the BEST Hollow Cement Blocks of any Machine on the Market. It Tamps on the Face, an Important Fact to Consider when Purchasing a Cement Block Machine.

Price 50 Dollars

Weight 700 Pounds

Just the thing for the Mason, Builder, Contractor or any person with Small Capital desiring to enter into a

PROFITABLE BUSINESS

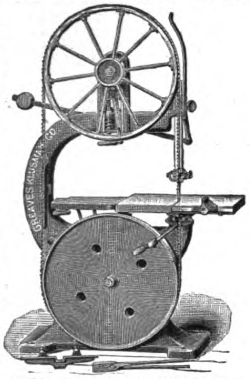
This Machine has reached the height of Perfection in Simplicity, Durability and Quickness. DON'T DELAY! DON'T HESITATE!

Send for our Descriptive Circular and Prices.

MANUFACTURED BY

ENTERPRISE FOUNDRY COMPANY

Office and Works: 81 OLEAN STREET ROCHESTER, N. Y.

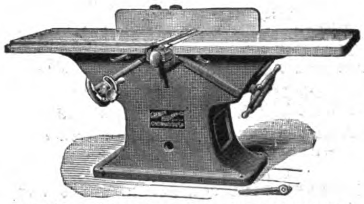


NEW PATENT 36-INCH BAND SAWING MACHINE.
Furnished with rip gauge, roller guards, wood rim wheels, etc. Table can be tilted 45°.

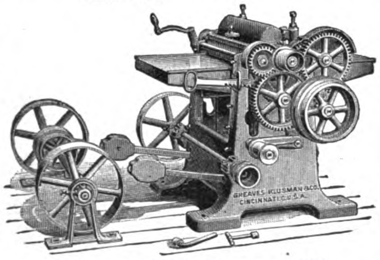
EXPOSITION
OF
Wood Working Machinery
FOR
Carpenters and Builders

Modern in design and construction, with improved methods of adjustment. Circulars and descriptive matter sent upon request.

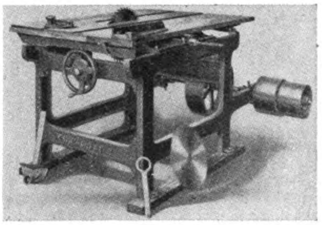
COME AND SEE US!



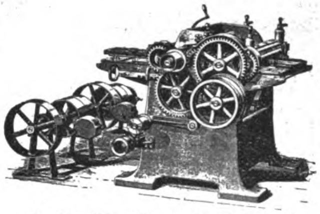
IMPROVED HAND PLANER AND JOINTER,
Tables over 7 feet long and have steel lips.
Cylinder Slotted to receive moulding bits and other irregular knives.
Cylinder has three Bearings, one of which is outside of pulley.



No. 2½ SURFACE PLANING MACHINE.
Planes 24½ inches and any thickness, from 1-16 to 8 inches.



A CARPENTER SHOP IN ITSELF.
CHICAGO No. 2 COMBINATION SAW TABLE.
An excellent machine for ripping, cutting-off, mitering, dadoing, boring, etc.



No. 2½ IMPERIAL 6-ROLL PLANER, MATCHER AND MOULDER.
Cylinder double belted, six large feed rolls. Fast and slow feed. Planes 24¼ inches wide, 8 inches thick, and matches up to 12 inches wide. Weight 3000 lbs.

WRITE FOR PRICES ON REBUILT MACHINERY.

CHICAGO MACHINERY EXCHANGE, 13-15 North Canal Street,
CHICAGO, ILL.

YOU TAMP ON THE FACE IN THE "IDEAL MOLD."

"On the high wave of popularity"

THE RESULT:

A Forty Ton Pressure on an "Ideal" Block without a crack in either the Block or the Face.

The "Ideal" reaches the highest point in
Simplicity
Durability
Adaptability
Rapidity.

A word about the "Ideal" Block Machine.

There are 200 different sizes and faces that can be made on the "Ideal" Machine.

The "Borst" System of facing is used.

The "Ideal" is not a new machine. It has been tried and tested for four years. The parts are interchangeable to various widths and divisional to sixteen lengths. The cores are withdrawn horizontally by lever. Guaranteed Capacity: Two men, ten hours, 200 blocks.

No wheels, cogs, gears, chains, or cranks to get out of order. Send for Catalog "A"

In corresponding with us we make our business your interests.

IDEAL CONCRETE MACHINERY COMPANY
SOUTH BEND, INDIANA.

COPPER LIGHTNING RODS

ABSOLUTE PROTECTION from LIGHTNING is given by use of our continuous copper conductors.

E. G. Washburne & Co., 46 Cortlandt St., New York.
Telephone 3125 Cortlandt.

Work put up or material furnished.

THE IMPROVED Hand and Foot Power **E. F. B.**

SAWING MACHINE.

For Carpenters, Builders and All Wood Workers Who Have Shops Without Power.

SEND FOR CIRCULAR.

THE BARNES TOOL CO., New Haven, Conn.

Diamond Expansion Bolt.

Patented.

For fastening fixtures, timbers; etc., to brick, stone concrete or other masonry.

DIAMOND EXPANSION BOLT CO.,
9-11-13-15 Murray Street, New York, N.Y

PASS

International Correspondence Schools
Box 969, Scranton, Pa.

Send free your booklet "1001 Stories of Success," and pass the undersigned to a full explanation of how he (or she) can qualify for a larger salary in the position before which is marked **X.**

- Architect
- Archit'ral Draftsman
- Building Inspector
- Contractor & Builder
- Structural Engineer
- Mechanical Engineer
- Mechanical Draft.
- Machine Designer
- Electrical Engineer
- Municipal Engineer
- Heat. and Vent. Eng.
- Chemist
- Sheet-Metal Draft.
- Sanitary Engineer
- Foreman Plumber
- Electrician
- Steam Engineer
- Marine Engineer
- Surveyor
- Textile Expert
- Bookkeeper
- Stenographer
- Ad Writer
- French } With Edison Phonog'ph
- German }
- Spanish }

Name ____________________

St. & No. ____________________

City ______________ *State* __________

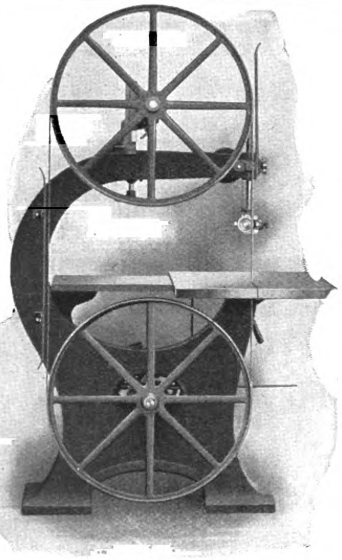
The Pass to a Larger Salary

Have you ever stopped to consider what the above coupon is worth to you? Have you ever reasoned that it is the offer of the Largest Educational Institution in the World that has had 14 years' experience in qualifying tens of thousands of people for better positions and increased earnings, to help **YOU** obtain a better position and a larger salary?

A coupon like the above has proved the pass to a larger salary, a better position, and increased happiness and prosperity to over 100,000 people, who are living proofs that we can do all we say. If you so wish, we can give you their names and addresses and you can ascertain from them the truth of our statements.

If **YOU** really want to better yourself, the I. C. S. can and will help you, no matter how poor your circumstances are; no matter how young or how old you are; how scant your education may be. No time lost from your present work. No books to buy. Pay on terms you can afford. If you realize the worth of this coupon, mark it and mail it to the Schools. It puts you under no obligation to do this. It is simply a free way to find out how to make a success of your life.

USE YOUR PASS NOW



The Rigid Construction and Modern Design of the New 36-inch CRESCENT BAND SAW insure a machine of the very highest effciency as a rapid producer of accurate work.

CRESCENT machines cost less than others of equal merit.

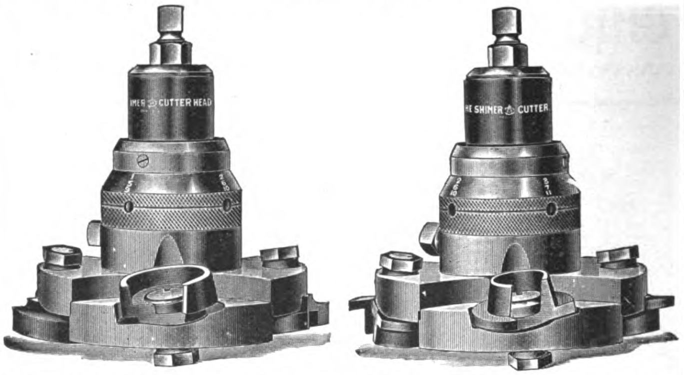
They are best because they are strong, durable and practical.

They are low in price because they are in big demand and we have to build them in large quantities.

Send at once for catalogue describing our complete line of **BAND SAWS, SAW TABLES** and **JOINTERS.**

THE CRESCENT MACHINE COMPANY, 206 Main Street, Leetonia, Ohio, U.S.A.

Durable and Always Reliable



THE SHIMER CUTTER HEADS

ARE MADE OF STEEL FORGINGS OF A GUARANTEED TENSILE STRENGTH OF 60,000 LBS. TO THE SQUARE INCH;

The Cutters are made of the Best Quality Tool Steel, tempered to file or to grind and guaranteed superior as regards cutting quality and general edge holding properties.

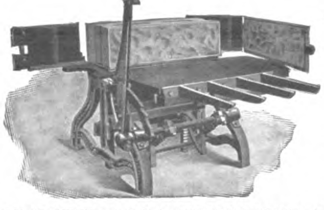
They Cut with Ease the worst cross-grained and knotty lumber you may find and do the work perfectly.

When you want a Cutter Head of any kind, write us fully and let us submit you prices.

Address SAMUEL J. SHIMER & SONS, Milton, Pa.

CONCRETE BLOCK, BRICK, POST and MIXING MACHINERY

"We have the leaders—strictly high grade"



NORMANDIN BLOCK MACHINES

HIGHEST AWARDS

FAVORITE CONCRETE BRICK MACHINES

CEMENT MACHINERY CO., Hall Bldg., **Jackson, Mich.**


Dunn's Gravity Mixer 1

Gravity Mixers

Patents Pending

The Dunn Gravity Mixer has no complicated mechanism to get out of order and we guarantee it to mix as fast as four men can shovel and do it far better than any other mixer on the market. We also manufacture the Victor Brick and Tile Machine, Dunn's Hollow Cement Stone Machine. Concrete Pipe Moulds, and Sectional Circular Moulds, and Pier Moulds. Write for circulars.

F.W. Dunn Company

1486 N. Rockwell Street, Chicago, Ill.

ARCHITECTS! CONTRACTORS! BUILDERS!

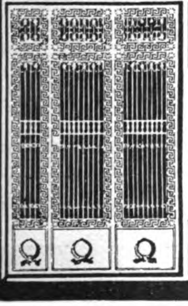
When you want any STRUCTURAL WORK it will pay you to write to the

BOSTON BOLT COMPANY
ESTABLISHED 1872

Works, Offices and Salesroom
38-54 Farnsworth Street

Convertors of Iron and Steel into Bolts, Expansion Bolts, Nuts, and all kinds of Structural Work for Mills, Churches Halls, Factories, Bridges, Wharves, Etc., and Iron Work of all kinds forged and made to order. *Send for catalog.*

JOHN W. CROOKS, Treasurer
BOSTON, MASS.



ELEVATOR ENCLOSURES

We are large manufacturers of Elevator cars and Enclosures. Also Bank and Office Grille Work.

Window Guards, Ornamental Wire, Iron, Steel and Brass work of every description in any finish.

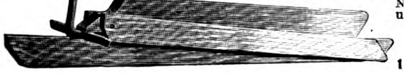
Our workmanship cannot be excelled.

Send for Catalogue.

F. J. MEYERS MFG. CO.
HAMILTON. OHIO. U.S.A.

JACKSON'S SCAFFOLD BRACKET HOOK

The Simplest, Strongest and Cheapest Device made for Holding up Scaffolding. Hook is ten inches long, made of best malleable iron, and saves its cost many times over in one season's work.



Easy to put on Bracket. Easy to put Bracket on Building.

No wiggling or falling scaffolds where this hook is used. *Write for Circulars.* Sold to builders with or without the folding brackets.

BRACKET HOOK CO.,
119 N. Winnebago Street, Rockford, Ill.

DO YOU WANT THE BEST

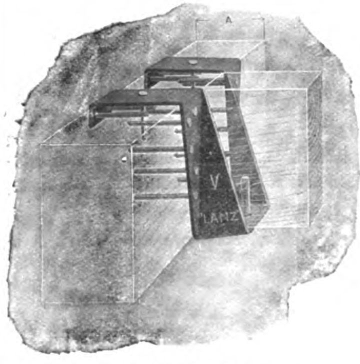
DRAWING TABLE

made? If so send for illustrated catalogue and prices.

R. E. KIDDER,
22 Hermon Street, Worcester, Mass.

Made in Pittsburgh
"Lanz" Joist Hangers and Stirrups

We court comparison. Prices attractive. Joist Hangers made to spike on, for brick-work, concrete blocks and I-beams. Write for descriptive matter 312.



PATENT APPLIED FOR

1865 M. Lanz & Sons 1906
Pittsburgh, Pa.

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

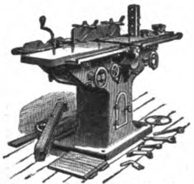
CORDESMAN, MEYER & CO., 26, 28 and 30 Central Avenue,

CINCINNATI, OHIO.

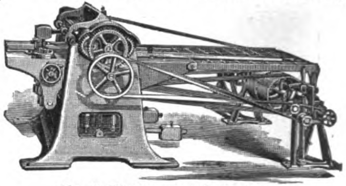
Finest Grades of Latest Improved

Wood-Working Machinery

For Planing Mills, Furniture and Chair Factories, Carriage, Wagon and Agricultural Works. Circulars and prices. Correspondence solicited.



Universal Wood-Worker.



No. 2 Planer and Matcher.

FOX

Adjustable Saw Dado Heads

The best thing for cutting grooves.

Fox Foot Power Miter Machines

The best thing for mitering mouldings and similar work.

We also make

Universal Trimmers,
Boring Machines, Lathes,
Planers, etc.

FOX MACHINE CO.

387 N. Front St., Grand Rapids, Mic

The Edwards Metal Ceilings

Artistic	Ornamental
Sanitary	Permanent

Write for Descriptive Catalog H, and special proposition to agents.

Everything in Sheet Metal Building Material illustrated and described in our large 132 page Catalog L, sent free upon request.

The Edwards Manufacturing Co.

"THE SHEET METAL FOLKS"

423 to 443 EGGLESTON AVE. CINCINNATI, OHIO

Its application is very simple— no experienced help is needed. With every roll are included nails, tin caps and cement sufficient for the work. RUBEROID is so pliable that it fits anywhere.

THE well-told truth has for 13 years drawn builders' attention to **RUBEROID ROOFING**—demonstration of this truth has made its believers legion. **RUBEROID ROOFING** does all claimed for it. It *is* water and weather-proof. Its resistance to acids, gases, great heat and even fire is extraordinary. It will *not* melt, rot or crack. But "above all things" avoid imitations. Look for the registered trade mark "**RUBEROID**" always stamped on the under side. Send for samples.

MANUFACTURED SOLELY BY

THE STANDARD PAINT CO.,

100 William St., New York.

CHICAGO OFFICES: 188-90 Madison St.

All Manner of Handy Rules for the Estimator are given in . . .

HODGSON'S

Estimating Frame and Brick Houses

ONE DOLLAR, POSTPAID.

DAVID WILLIAMS CO., 14-16 Park place, N. Y.

We make Ceilings for churches, schools, stores, lodge rooms, court rooms, libraries, residences, etc.

Our ceilings are shipped ready for erection. No expert labor required. Working drawings furnished. They're adapted to any kind of building. Exclusive in classified design.

Berger "CLASSIK"

Steel Ceilings

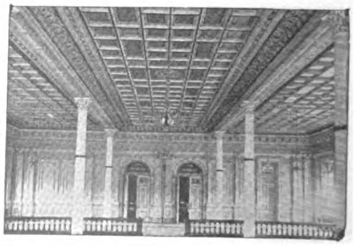
We also make Steel Roofing, Siding, Metal Shingles, Architectural Sheet Metal Work and Fireproofing Material.

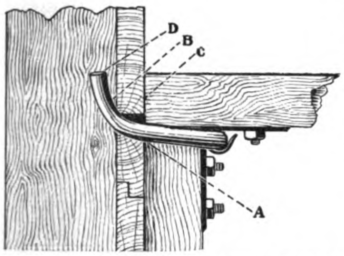
Our catalogues sent you free. Ask for them.

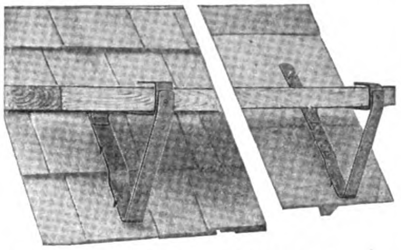
THE BERGER MFG. CO.

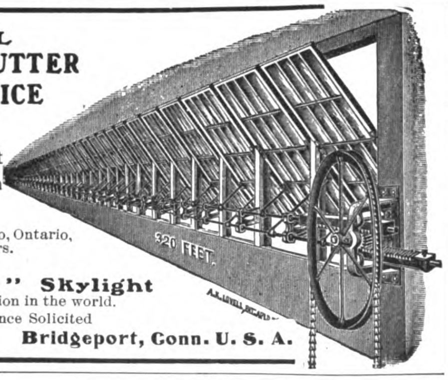
CANTON, OHIO.

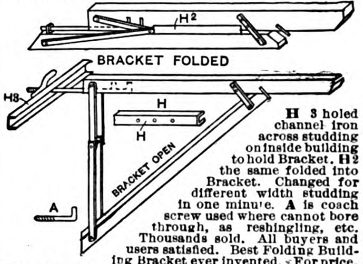
New York. Boston. Phila. St. Louis

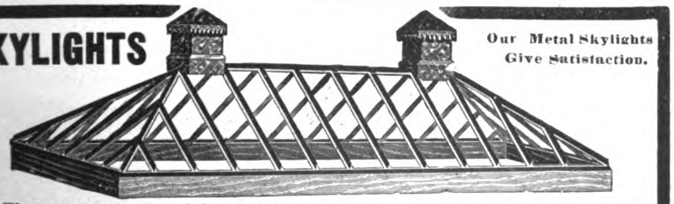



D
B
C
A




320 FEET.


H2
BRACKET FOLDED
H8
H
H
BRACKET OPEN
A




EASTLAKE SHINGLE

WHEELING METAL CEILINGS

MANUFACTURED BY

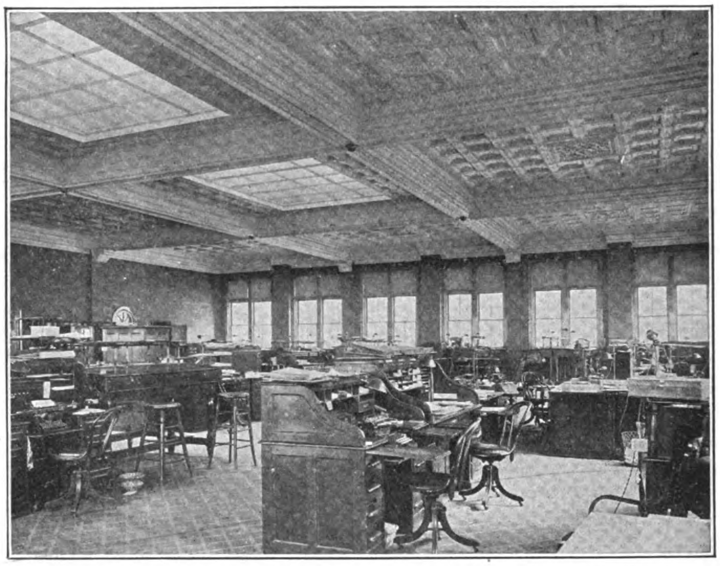
WHEELING CORRUGATING CO., Wheeling, W. Va.

Fire Proof

The Most Artistic Interior Finish

Moderate in Cost

For Buildings of all Kinds



Send Plan

Ask for Estimates

Large Stocks Carried in all Our Warehouses

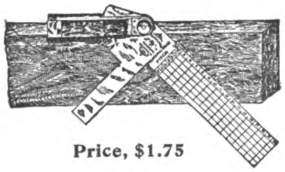
Nothing Too Large For Us

SECTION of GEN. OFFICE WHEELING CORRUGATING CO. METAL CEILING DESIGN No. 1202

BRANCH OFFICES AND WAREHOUSES

New York City	47-51 Cliff Street	Philadelphia	402, 404, 406 Race Street
Chicago	45 and 47 Lake Street	Boston, Mass.	132 and 134 Pearl Street
St. Louis	112, 114, 116 South Eighth Street	Chattanooga, Tenn.	King Street

---



Price, $1.75

TOPP'S FRAMING TOOL.

A PERFECT TOOL and the only Tool for the purpose ever invented.

Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

Write for booklet. Address the manufacturers,

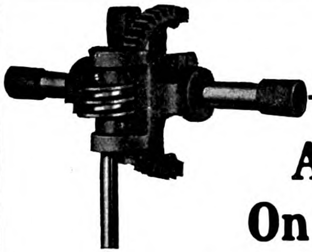
G. A. TOPP & CO., - Indianapolis, Ind.

SECURE PROTECTION AND LONG SERVICE BY USING OUR ASPHALT ROOFING

SAVES REPAIRS
SAVES RECOATING
SAVES RENEWING

Send for Samples and Pamphlet

STOWELL MFG. CO.
JERSEY CITY, N.J.



Another Hint On Ventilation.

Let's take it for granted you want to operate runs of sash in a monitor: How shall you place the operating rod? With our device, place it anywhere. Bring it down the post or carried along the roof line and down the side. This gear will do the work from anywhere at any time.

Catalogue X-V.

LORD & BURNHAM CO.
1133 Broadway, cor. 26th St., New York.
Boston Branch: 819 Tremont Building

We Give Particular Attention To Special Designs

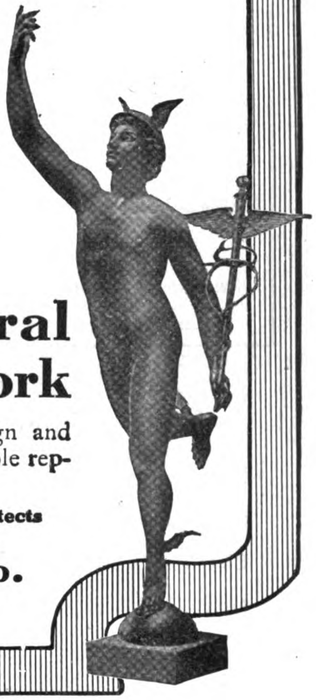
and are fully equipped to execute the most intricate and delicate work ever attempted in sheet metal.

Mullins
Art Architectural Sheet Metal Work

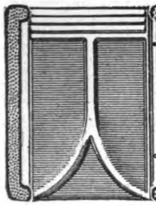
is far in advance in architectural design and artistic execution and has won an enviable reputation for excellence.

Estimates, Designs, etc., submitted to architects builders and contractors on request.

The W. H. Mullins Co.
208 Franklin St., Salem, Ohio.
(Everything in sheet metal.)

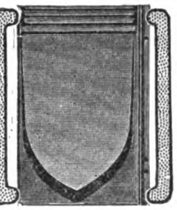


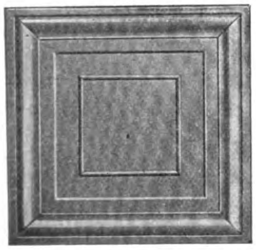
CORTRIGHT METAL SHINGLES



Who can drive a nail better than a carpenter? Then who has a better right to make money laying Cortright Shingles?

CORTRIGHT METAL
ROOFING CO.
Philadelphia and Chicago





LOCK-JOINT METAL CEILINGS

Absolutely Dust Proof. Easily Erected. Artistic Designs.

——*Ask for Catalogue "D"*——

S. KEIGHLEY METAL CEILING & MFG. CO.
PITTSBURG, PA.

PLUMBERS' SUPPLIES
AT WHOLESALE.

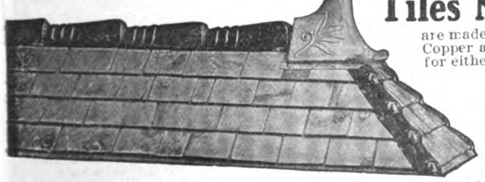
If you need anything in my line, and wish to **SAVE 20 to 40 Per Cent** on every article, write for my free illustrated Catalog. Shipments promptly made from a very complete stock of guaranteed goods.

Small orders are as carefully handled as large ones.

B. C. KAROL, 235 W. Harrison St., Chicago, Ill.

TOP IT OFF WITH The Willis Cresting Tiles No. 59

and make a perfect and handsome roof. They are made of Tin, painted, Galvanized Steel, Copper and Coppered Steel, and suitable for either slate or shingle roofs.



Send for miniature samples and our Catalogue No. 5, showing a very complete line of cornices, crestings, finials, skylights, and stamped ornaments in zinc, and STEEL CEILINGS, etc.

Makers of the Willis Hip Shingles.

WILLIS MFG. CO., Galesburg, Ill.

Notice Carpenters!!!

The second edition of **The Lightning Estimator**, the book that has had such a remarkable sale in the last year, at 50c a copy has been exhausted.

We have ready the third edition greatly improved and one-third larger, which will sell for the low price of 60c (Money order). Simple, rapid, practical, accurate, reliable.

Prepared by a prominent builder.

Based on records of actual construction, not theory.

A $2,000 house estimated in 30 minutes.

Third Edition 60c, Write now.

BRADT PUBLISHING CO.,
JACKSON, MICH. 260 Michigan Ave

TAKE THE "SHORT CUT" and SAVE TIME and MONEY every time

Grinnell's Estimator and Builders' Pocket Companion

A marvel of rules, statistics, methods of saving money by practical and accurate "short cuts." Contains Grinnell's new system of

ESTIMATING LABOR AND MATERIAL

Over forty tables for the different branches of the building trade. The Rafter Table with corresponding Hip and Valley Table for eleven different pitches with rules for estimating, figuring, framing and erecting intricate roofs.

No architect, contractor, mason, builder, bricklayer, cement block maker, concrete user, plasterer, painter, lumber dealer, teamster or prospective builder can afford to be without it.

To the novice who wishes to rise from the rank and file and be a builder or contractor himself later, this book will be the key note of his success, as it will give him in one week's time what he couldn't learn otherwise in five years.

In Alligator or Embossed Leather $1.00; Paper 85c.

The Grinnell Publishing Company
213-B Law Exchange Bldg.
BUFFALO, NEW YORK

ONE of the most interesting and profitable ways of spending the winter evenings is to practice drawing.

Edminster's Architectural Drawing

presents a thorough course of instruction.

In addition to the text there are 105 full-page plates for guidance.

Size 7 x 9 inches, oblong
Two Dollars, Prepaid

David Williams Company
Publishers
14-16 Park Place,
NEW YORK

GET OUR PRICES ON

METAL CEILINGS,

TIN PLATE,

EAVES-TROUGH, CONDUCTOR PIPE,

CHARCOAL IRON TIN,

CORNICE, SKYLIGHTS, FINIALS, ETC.,

BEFORE BUYING.

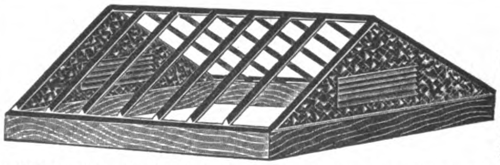
THE ELLER MANUFACTURING CO., - Canton, O.
Successors to J. H. ELLER & CO.

Combines durability, low price, ease of application, fireproof qualities and sightliness, just what the buyer of roofing material demands.

The cheapest way to repair old shingle roofs is to cover with **PERFECTED GRANITE ROOFING.**

SEND FOR PHOTO PAMPHLET.

Eastern Granite Roofing Co., Irving Building, New York.



ART METAL CEILINGS

Exclusive and Artistic Designs appropriate for any style of architecture.

All Styles Galvanized and Copper Skylights, Cornices, Finials, Crestings, Ventilators, Metal Shingles, Roof Gutters, all styles painted and galvanized Iron Roofing and Siding, etc. Write for Catalogue and Prices. Estimates free.

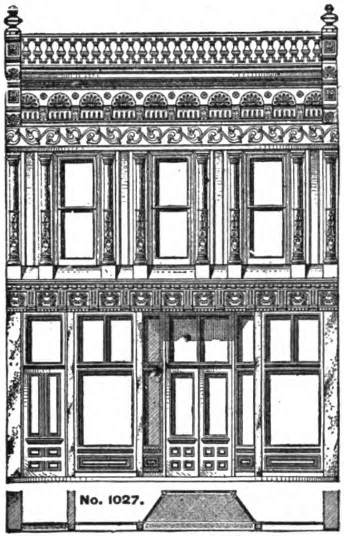
Kanneberg Roofing & Ceiling Co.,
Manufacturers,
CANTON, OHIO.

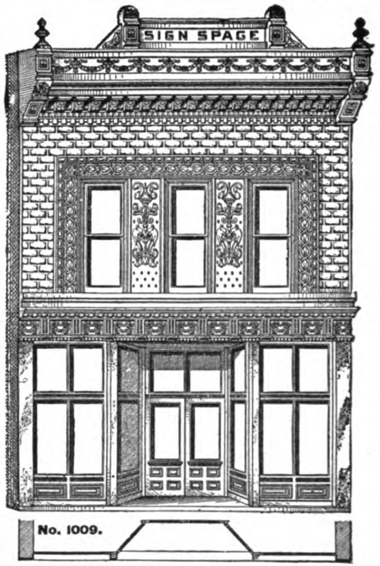
PRODUCERS OF

ROOFING SLATE

SLATE BLACKBOARDS.

THE E. J. JOHNSON CO.
38 Park Row,
New York.
Quotations delivered anywhere.
Slaters' Supplies, Snow Guards.
Write for Price Book


No. 1027.



No. 1009.

A New and Convenient Reference for the Builder and Contractor.

The Estimator's Price Book and Pocket Companion

By I. P. HICKS

This book is gotten up to bring within a small and convenient compass the prices of all descriptions of building material, thus saving the estimator much of the time and trouble involved in consulting trade catalogues.

Not only are the average market figures of all material required in the construction of ordinary buildings presented, but the entire matter is interspersed with useful information, with data on measurements and on quantities of materials required and with labor saving tables, making the book one of exceptional usefulness.

* * *

In order that this handbook may be easily adapted to conform with the variations in figures prevailing in different localities, blank spaces are provided throughout for appending memoranda of local prices, or those which meet the requirements of special work.

A numerous collection of handy tables is a useful feature. These include lumber measure, complete rafter tables for any width and pitch of roof, sizes and weights of iron columns and I-beams required to carry certain loads, safe bearing loads of timber, and of structural iron, &c.

* * *

Mr. Hicks also presents along with other points on estimating, a practical short-cut method which he considers to be the best yet devised.

172 pages. Handy Pocket Size. Cloth bound:
Price $1.00 Postpaid.

Published by

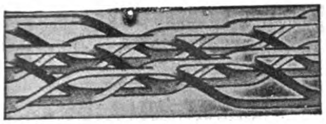
DAVID WILLIAMS COMPANY

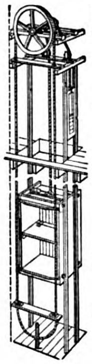
14-16 PARK PLACE NEW YORK

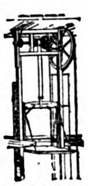
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

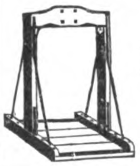
Digitized by Google

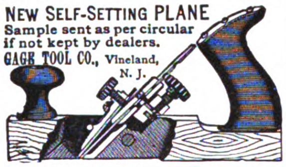
Original from
UNIVERSITY OF MICHIGAN

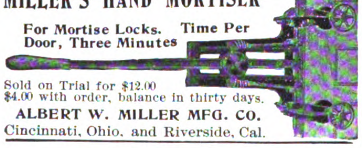


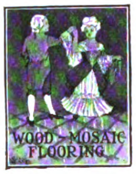




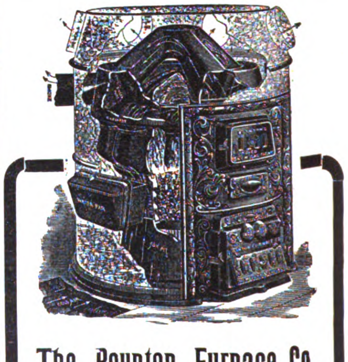







WOOD-MOSAIC FLOORING


VERTICAL SECTION
LONGITUDINAL SECTION.
CROSS SECTION THROUGH FLOOR



CARPENTRY AND BUILDING

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

MAY, 1906.

The Building Situation.

Bearing out the bright promises of the early months of the year the building season is opening most auspiciously, and reports from leading centers show preparations to be in progress for an amount of work which gives every indication of equaling, if not exceeding, the very flattering results of 1905. In viewing the influences which have tended to bring about this condition of affairs account must be taken of the extensive improvement of the outlying districts of many of the leading cities and the extent to which dwelling houses have been erected in connection therewith. In fact, this has been a notable feature of the operations during the past year and gives promise of continuing for some little time to come. In contrast to the activity in this particular line has been the marked falling off in the number of towering office buildings or skyscrapers, as they are perhaps more commonly called, although this year a decided tendency toward these larger undertakings is to be noted, and in some cities preparations have been made for the erection of many business structures of a most pretentious character, involving an enormous outlay of capital. A cursory examination of the reports presented in another part of this issue bearing upon the building situation in many sections of the country will show where the greatest activity is to be expected. Locally, the situation is full of encouragement, and the plans thus far filed the present year with the Bureau of Buildings show improvements contemplated involving an outlay of capital several millions in excess of the same period in 1905. Prominent among the buildings for which permits have recently been issued may be mentioned the mammoth Pennsylvania Railroad Terminal, estimated to cost $4,000,000; the 12-story apartment hotel to be erected by William Waldorf Astor, to cost $2,000,000; the 25-story office building at Broadway and Cortlandt street, to cost three and a quarter millions; a 12-story loft and office building on the site of the old Brunswick Hotel at Fifth avenue, Twenty-sixth and Twenty-seventh streets, to cost $1,200,000, together with a number of high-class apartment houses ranging in cost from $100,000 upward and aggregating a total which will reach into high figures. While the activity in building is likely to be pretty well scattered over the city, the scene of the larger percentage of operations will be that section which lies between Fourteenth and Fifty-ninth streets on the west side. There is at present enough work in prospect to keep the members of all branches of the building trades busily engaged throughout the entire season, and barring untoward labor disturbances the year should prove highly satisfactory to all concerned.

Household Illumination.

For some time there has been a gradual awakening, especially in electrical circles, to the faulty methods of illumination in vogue. The wonderful strides in the art of illumination that have been made since the relatively late farewell to the candle and then to the fluid lamp, until we now have kerosene, acetylene, gas and electricity, have tended to becloud our conception of what really is good illumination. As the campaign of education in this line is pursued and gradually increasing numbers begin to realize the fundamentals of good illumination then will there follow an adjustment from the commercial standpoint whereby it will be necessary to strike a mean between ideal illumination and the cost of the illumination. Few are apt to take seriously a dictum that our lights in a room, for example, should be distributed in small units around the walls. We seem to prefer a miniature sun in the middle of our rooms on the level with our eyes. At present it seems to be only within the realm of the wealthy to secure the beneficial and pleasing effects of well distributed illumination, but those who are willing to pay for the best in the way of sanitation in their dwellings will doubtless be willing to pay for the pleasure of good lighting. That the subject of proper illumination is receiving considerable attention is no better illustrated than in the recent organization of the Illuminating Engineering Society. The prominent members of this association are men who have been identified some time with lighting work and who have shown that the study of illumination is one sufficiently specific to add a new line of engineering to our professions, that of the illuminating engineer. What this organization will accomplish remains yet to be seen, but it is certainly the concentration of interests in a line of work which observers have noted as one of special problems. What its influence will be for household illumination remains also to be seen, but it certainly will serve to direct more quickly general public attention to a neglected detail of household convenience.

Co-operation in Slate Roofing.

It is in no small degree voicing the sentiments of slate roofers generally to say that they regard the conditions existing at the present day in the slate roofing trade as very unsatisfactory. There is no indication of obstruction to, if there is not indeed a fostering of, the free distribution of roofing slate, but to put it mildly, it is rather disconcerting to find roofing slate obtainable in the general market at the prices accorded to the trade. While roofing slate is building material, it will not grow in demand if treated the same as lime, sand, nails and rough lumber. Experience and skill are required in its application to make it a satisfactory building material, and when sold to everybody the price suffers, the work deteriorates and the service is so poor that it becomes unpopular and the sales fall off. Good work cannot be done for nothing, and it is unreasonable to expect the slate roofer to compete successfully with any jack of all trades who undertakes to do the work himself. Like lots of other things which appear simple, there are a good many details of slate roofing mastered only by experience. Good work is its best advertisement, and it is the belief that with desirable conditions existing not only is there a greater chance for an increase in the slate roofing business on account of the popularity which follows well executed work, but with satisfactory arrangements the slate roofer is to be depended on to push his end of his business to a greater extent than he is warranted in doing at present. It is believed that the present time is the right one for producers of roofing slate to deliberate on the question of placing their output through the best chan-

nels under conditions which will give those channels an advantage, this in turn leading to increasing output and better work.

Philadelphia's New Theater.

The City of Brotherly Love is soon to have a theater which as regards its seating capacity will rank as one of the biggest enterprises of the kind which has ever been undertaken in Philadelphia. The construction will involve the use of brick, stone, concrete and steel, and notwithstanding the fact that it will be as nearly fire proof as it is possible to make a building it will be equipped with the latest fire fighting appliances, and the exits are to be so arranged that the house may be emptied in less than two minutes in case of an emergency. One of the novel features will be a spacious playroom in the basement, in charge of trained nurses, and fitted with swings and other amusements for children. The fire curtain will be a solid wall of steel concrete and asbestos, 3 inches thick, and it will be raised and lowered by means of electric motors, as is the case with the fire curtain in the Lyric Theater. The structure will have a seating capacity of 4100 persons and will cost in the neighborhood of $500,000. On every floor will be smoking and lounging rooms, and similar apartments will be provided for the performers under the stage. The new theater will be located at the corner of Lancaster and Fairmount avenues, and it is expected to have it completed in time for the season of 1906-7.

◆

Relative Cost of Building Construction.

More or less has recently been printed regarding the cost of buildings at the present day as compared with, say, ten years ago, and in view of the high prices of materials and labor it is interesting to study the data covering the two periods. In our last issue we gave some figures on the subject in the shape of a reprint from a late issue of the *Record and Guide*, and we take pleasure in presenting herewith from the same source the views of George Hill, a consulting engineer, dealing with the phase of the matter suggested by the title of this article.

"Whether a person be architect, builder or owner, the natural answer to the question as to the relative cost of buildings to-day, as compared with ten years ago, would be that they were very materially higher; but a careful consideration of the subject leads inevitably to a modification of this view. If by reason of more stringent laws the accommodations of a certain class of buildings are made more expensive, it does not necessarily follow that the cost of the building has been increased through an increase in the price of materials or the cost of labor; if the man earning from $3000 to $5000 a year demands in his dwelling two good bathrooms and steam heat, where he was formerly content with a hot air furnace, one toilet and a tin bathtub, that increase is not chargeable to the increased cost of labor or materials; if by reason of insufficient renting space in a given locality the rentals per square foot for offices increase 25 per cent., and owners lavish marble, cooled distilled drinking water, and other things to attract tenants to new buildings, requiring an additional outlay, that is not chargeable to the increased cost of labor and materials.

"On the other hand, in both the architecture and engineering of buildings, the last ten years has seen a vast improvement—designs are very much simpler and better, architecture is more truly the science of ornamented construction, the economical use of the materials of construction has greatly advanced, and engineering knowledge of limiting economic conditions has been greatly extended. Building problems are receiving ten times the study that they received ten years ago at the very lowest estimate, and these influences have combined to decrease the amount of material and labor required to secure given accommodations.

"I have made a comparison of costs of a number of buildings erected ten years or more ago with similar buildings erected recently, and find that by the application of intelligent, enlightened design the building of today to accommodate a given number of guests, if it be a hotel, or to give a certain number of square feet of rental floor space, if it be an office or loft building, costs practically but little more than the corresponding building of ten years ago. While it is true that the wages paid to labor have materially increased in amount, it is also true that labor, when unhampered by union restrictions as to the amount to be accomplished, will do enough work to make the unit cost for labor no greater than it ever was.

"In making the comparison above spoken of I find greater differences in cost between practically exactly similar buildings (by which is meant buildings renting the same utilities for the same gross amount) than existed between similar buildings erected ten years apart, but both intelligently designed, so that it is incumbent on the owner more to-day than ever before to choose his designer, whether it be engineer or architect, wisely."

◆

Some Difficult Foundation Work.

In putting in the foundations of the new 22-story steel skeleton frame building now in course of construction for the United States Express Company at Rector and New Church streets, New York, just across from old Trinity Church yard, unusual difficulties had to be overcome due to the fact that the site is bounded on three sides by the elevated railroad. There were ten columns or posts of the elevated structure opposite the site, and all of these columns were within the curb line, which, of course, brought them very close to the edge of the excavation. Again, on one side the caissons had to be sunk within 2 inches of the side wall of the old structure located at that point. It was necessary to shore up this old building, and it had to be done within the space available, which it will be seen was exceedingly small. The work was accomplished by jacking to solid footings six 8-inch pipes which were filled with concrete and capped with granite. On top of this cap was another granite block, and wedges were driven between the two blocks to take the weight of the building.

It was also a somewhat delicate matter to protect and support the ten elevated railroad columns. All shoring was braced from a frame in the center of the lot, the braces running in all directions from this frame and being supported by it. Four of the derricks used to handle most of the materials were supported in the form of a square traveler on piling driven in the center of the excavation. The shoring frame was built about these piling and the traveler was directly over this frame.

It may be interesting to state that the approximate weight of the building is placed at 47,000 tons, which is supported by 64 columns distributed over 49 caisson piers. Twenty-one caissons are of the pneumatic type, 17 forming a continuous cofferdam around the entire four sides of the area. These 17 caissons were joined by a special joint in such a way that they formed a solid concrete wall 6 feet 6 inches across and were carried down to bed rock, an average depth of 55 feet below the street level. The other 28 caissons were distributed in such a way as to carry the interior columns inside the exterior wall. The walls inclosing the side were water proofed with the Winslow system of hydrolithic cement coating by The Foundation Company, which did all the foundation work. The result is a water tight cellar to a depth of 35 feet below the street level.

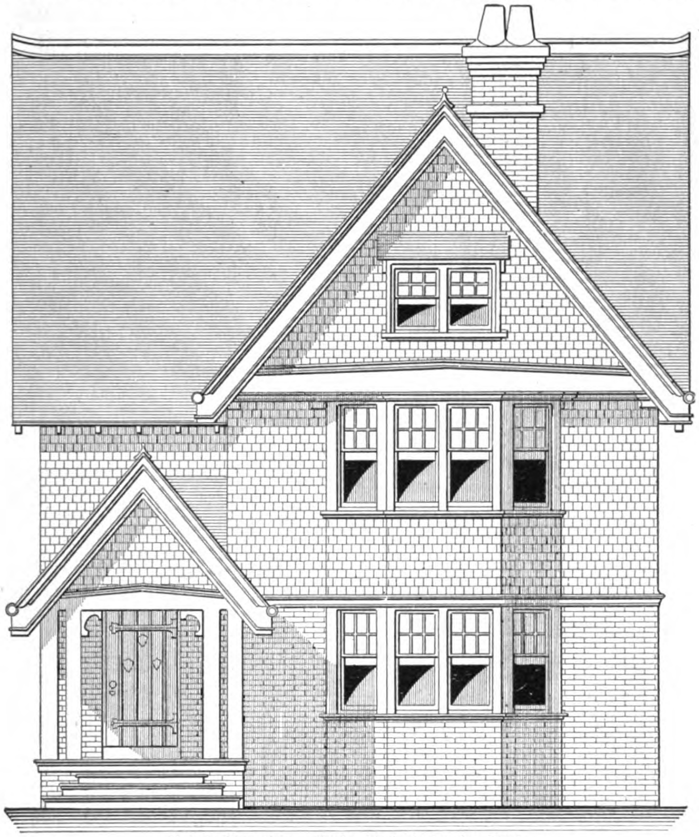
◆

The Municipal Art Society of New York City announces a competition for a design for the decoration with historic paintings of the two side walls of the west vestibule of the Morris High School, 166th street and Boston road, with prizes of $300 to first, $200 to second, $100 to third and two honorable mentions of $50 each. The sketches must be in not later than May 15. The dimensions of the wall spaces available for decoration are in each case about 11 feet long by 8 feet high, surrounded by polished pink Knoxville marble wainscoting. The bottom of the decorations is to be placed 6 feet above the main floor. Further information can be obtained by communication with the secretary, care National Arts Club, 37 West Thirty-fourth street.

COMPETITION IN $6500 HOUSES.

SECOND PRIZE DESIGN.

THE Committee of Award having in charge the competition in $6500 houses decided, as announced in our last issue, that the study contributed under the designation here indicated by Buemming & Dick, Pabst Building, Milwaukee, Wis., was entitled to the second prize, and we have pleasure in presenting the design herewith. The work indicated by the drawings has been executed, and on one of the half-tone supplemental plates we show the appearance of the completed structure. In its report the Committee of Award refers to the very good layout of the house and to the architectural effects produced, as indicated in the photograph.



Front Elevation.—Scale, 1/8 Inch to the Foot.

Competition in $6500 Houses.—Second Prize Design.—Buemming & Dick, Architects, Milwaukee. Wis.

Our readers will doubtless be interested in learning something of the authors of this design, and we therefore take pleasure in presenting in connection herewith excellent likenesses from recent photographs, together with brief sketches of their business careers.

H. W. Buemming was born in Toledo, Ohio, September 5, 1872, and early in life entered upon an architectural training. The time from 1889 to 1892 was spent in various Milwaukee architects' offices as draftsman, and in the latter year he went to Columbia University, where he completed a special course in architecture in 1895. He then entered the employ of George B. Post, one of the prominent architects of New York City, and acted as his Pittsburgh representative and superintendent until 1896, when he began the independent practice of architecture in Milwaukee. Mr. Buemming is a member of the Columbia University Architectural Society, the Society of Columbia University Architects and of the Milwaukee Architectural Club.

Gustave A. Dick, the other member of the firm, was born in Milwaukee, March 29, 1872, and spent the years from 1890 to 1894 in the offices of various Milwaukee architects. He finished a special course in architecture at the University of Pennsylvania in 1896, and then became associated with Mr. Buemming in the independent practice of architecture. He is a member of the Alumni Association of the University of Pennsylvania Architects and of the Milwaukee Architectural Club.

Specifications.

These specifications, in compliance with conditions set forth, are intended merely as a "brief specification outlining the construction of building and giving an indication of materials to be employed."

Mason Work.

Building was built on an inside lot, 50 x 150 feet.

Excavations.—The entire basement is excavated according to area of plans. The top of first floor joists is 35 inches above grade.

Grading.—The entire lot was graded and leveled.

Footings.—All walls, piers, chimneys, &c., have 5 x 24 inch footing stone.

Mortar.—Cement mortar used for all work below grade, lime mortar above grade.

Drain Tile.—A 3-inch drain tile pitched to catch basins was laid around inside of all footings.

Basement Sills.—These are bush hammered dressed limestone 5 inches thick for windows and 6 inches thick for doors.

Brick Work.—Brick used was hard and well burned. All cellar walls are built with 2 inches of continuous air space. All porch walls begin 5 feet below grade and extend up to sills.

All outside brick walls have ½ inch thick coat of strong cement mortar continuous from footing to grade.

Face Brick.—All brick work above grade course and brick veneering up to belt course of second story was semi-

vitreous dark red paving brick, laid with ½-inch thick joints in cream colored mortar.

All first-story window sills are constructed of brick set on edge, laid in strong cement mortar.

Chimneys.—All chimneys are built with flue lining and capped with solid cement caps. All flues provided with cast iron clean out doors.

Brick Fireplace.—This was built complete of a buff colored mottled brick laid with raked joints, hearth of similar brick and lined with fire brick.

Cement Floor.—All cellar floors, except laundry and rear entry, have a cement floor smoothly steel troweled and laid same as cement sidewalks.

Lathing and Plastering.

All walls and ceilings are lathed with No. 1 pine lath.

Mortar.—Lime mortar is used for plastering, the work being what is known as two-coat work, the last coat being sand float finish.

The entire first, second, third story, laundry and rear entry are plastered in this manner. The entire balance of cellar ceiling has one coat of plaster.

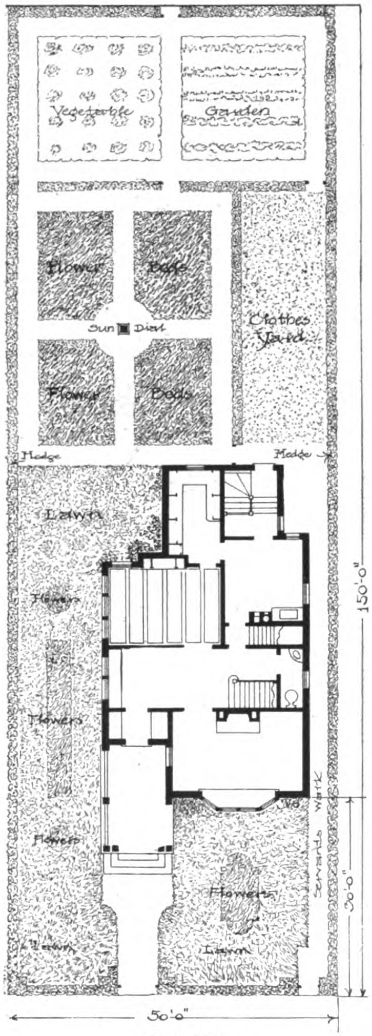
Adamant Wainscoting.—Kitchen and bathrooms have 5-foot high Adamant wainscoting, scored to imitate 4 x 4 inch tile.

Back Plastering.—All outside walls and roofs forming part of ceilings of rooms are back plastered one heavy coat.

Carpenter Work.

All structural lumber is first quality soft pine.

Bridging.—All joists are bridged for every 5 feet of span.



Block Plan.

H. W. BUEMMING.

GUSTAVE A. DICK.

Winners of Second Prize in $6500 House Competition.

Competition in $6500 Houses.—Second Prize Design.

Furred Ceilings.—All closets, pantry and rear entry are furred down to 7 feet 6 inches in hight.

Grounds and Furring.—All brick walls where plastered are furred and grounds put on for receiving all interior finish of every description.

Roof.—Roof is boarded with dry 8-inch wide boards laid ½ inch apart.

Shingles.—The entire roof and walls above first story have extra Star "A" Star cedar shingles. On walls every third course is doubled. All shingles were dipped before being put on.

Floors.—All wood floors in cellar, first, second and third story have under flooring of No. 2 M. and D. laid diagonally. The finished floor in cellar and attic is No. 2 maple. The finished floor of rear stair hall, rear entry, butler's pantry, kitchen and entire second floor is No. 1 maple. The finished floor for dining room, living room and vestibule is No. 1 red oak. Between top and under flooring of second and third story one thickness of Keystone hair felt and 1½ x 1½ inch strips are put down.

Outside Finish.—All outside finish is dry seasoned clear cypress for staining.

Sheathing.—The entire outside walls of building are covered with No. 2 fencing and extra heavy P. & B. building paper.

Windows and Sash.—All sash are 1⅜ inches thick, except for plate glass, where they are 1¾ inches.

All frames are box frames equipped with noiseless pulleys.

Weather Strips.—All first and second story windows, as well as rooms in attic, are equipped with Chamberlain patent metal weather strips.

Frames.—Pulley stiles, 1⅛ inches thick; blind stops, ⅞ inch; parting strips, ½ inch; sash stop, ½ inch, molded on the inside; sills, 1¾ inches thick, laid 3 inch bevel per foot; outside casings, 2¾ x 4½ inches, molded.

Door Frames.—Jambs to be 1¾ inches thick. Sills 1¾ inches thick of red oak.

Basement Frames.—These are made of select dressed plank with oak weather strip. Wind stop and casing same as balance of windows.

Doors.—All inside doors where oak finish is used have 1⅜-inch pine base with ¼-inch oak veneered on each side. Outside doors 1¾ inches thick, made of two thicknesses. Second-floor doors made of birch, veneered for staining.

Inside Finish.—Finish for attic, cellar, rear entry, kitchen and butler's pantry is clear cypress for varnish finish. Finish for entire balance of first floor is red oak.

Finish for entire second floor is white wood for white enamel finish. Doors of birch, strained mahogany.

The various seats, cabinets, sideboard, cases, mantel, shelves, &c., were built complete.

Dining room has beamed ceiling, plate shelf and 6-foot high paneled wainscoting.

The ceiling of reception and living room paneled by means of ¾ x 3½ inch molding, with similar molding in all angles.

Bedrooms have photo rail.

Kitchen and bathrooms have maple hospital base made of 1¾ x 5¾ inch maple.

Stairs.—The entire main stair is red oak, of design shown on scale drawings. All other stairs have 1⅜-inch thick maple treads.

Picture Molding.—All rooms throughout first, second and third floors have ¾ x 1¾ inch picture molding.

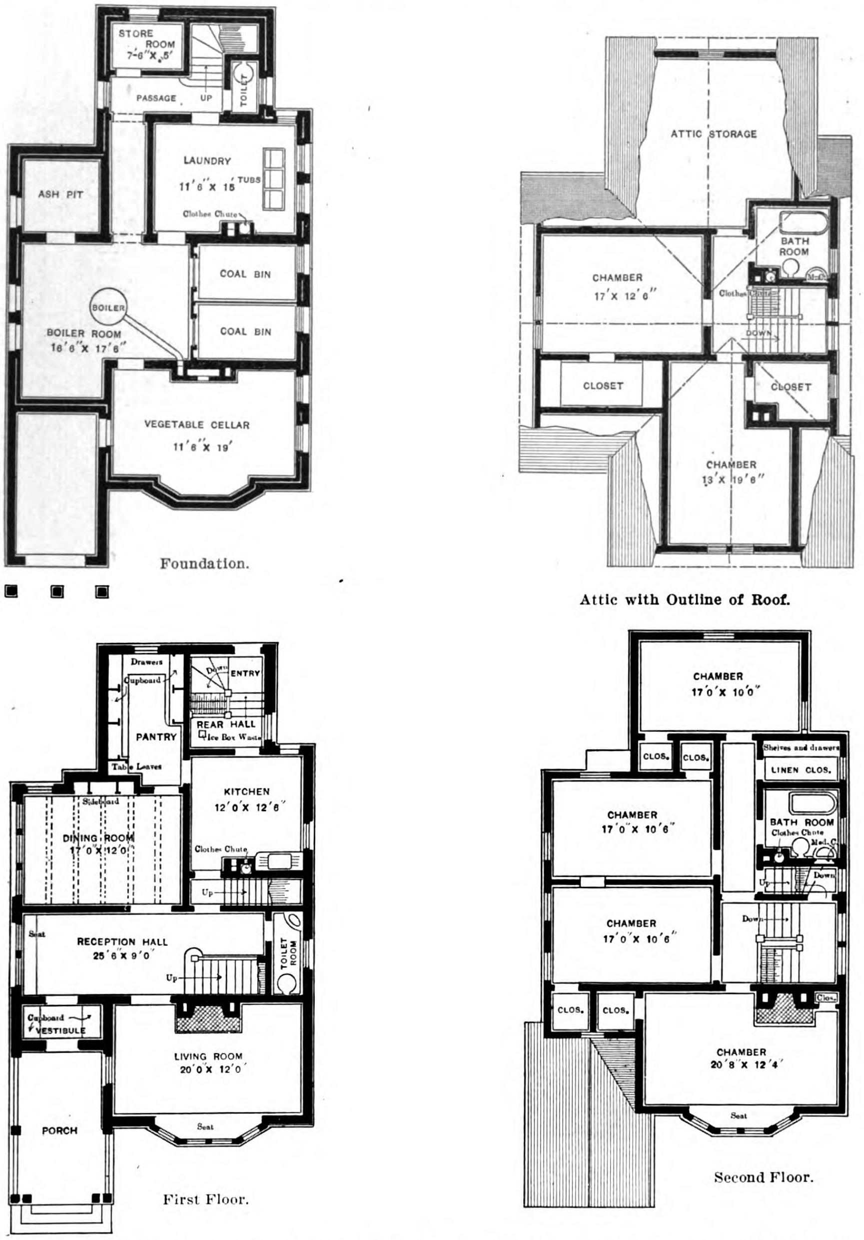
Butler's Pantry.—This is fitted up complete with doors, drawers, spice cabinets, cabinet for table leaves, &c., as shown.

Closets.—All closets are fitted up with movable shelves, clothes hooks and drawers.

Coal Bins.—These are built complete, as shown.

Vegetable Cellar.—Has substantial shelves, as shown, and potato and vegetable racks built under same.

Trimmings and Hardware.—Carpenter has estimated the sum of $100 for all trimming hardware.



Foundation.

Attic with Outline of Roof.

First Floor.

Second Floor.

Competition in $6500 Houses.—Second Prize Design.—Floor Plans.—Scale 1-16 Inch to the Foot.

Galvanized Iron and Tin Work.

All gutters are hanging gutters, with false bottoms, made of No. 22 galvanized iron.

Valleys.—Valleys are open and lined with antipinhole tin.

Flashing and Tin Roof.—All flashing and tin roofs are antipinhole tin.

Clothes Chute.—Is 12 inches diameter, of heavy galvanized iron, with damper at top and bottom.

Conductors.—Are made of No. 26 corrugated iron.

Painting.—All tin work is painted with mineral paint on both sides before being put up.

Painting and Glazing.

Exterior.—All exterior wood work, except sash and frames, is stained with two coats of Cabot's creosote shingle stain. All sash and frames painted three coats.

Shingles.—All shingles are dipped in Cabot's creosote shingle stain and are then treated with one brush coat after in place.

Interior Work.—All interior oak finish stained cathedral oak and then finished with two coats of varnish, the last coat rubbed.

Cypress finish has one coat of shellac and two coats of varnish. All second-floor doors have one coat of mahogany stain and two coats of varnish.

Enamel Finish.—All second-floor wood work, except doors, as well as adamant wainscoting, kitchen and bathrooms, has two coats of white lead and two coats of enamel.

Hardwood Floors.—Oak floors are stained and then finished with two coats of dull varnish. Maple floors one coat of shellac and two coats of varnish.

Glass.—Glass in large lights of main portion first and second story of best polished plate. Balance double thick.

Leaded Glass.—All lights in sideboard, front entrance door and concealed light in living room are leaded glass, estimated at $1.50 per square foot.

Mirrors.—Medicine cases and sideboard have polished plate glass mirrors.

Electrical Work.

Bell Hanging.—Entrance doors, dining room, second-story main chamber, have pushes operating annunciator in kitchen.

Electric Light Wiring.—The entire house is wired complete for electric lighting.

Plumbing.

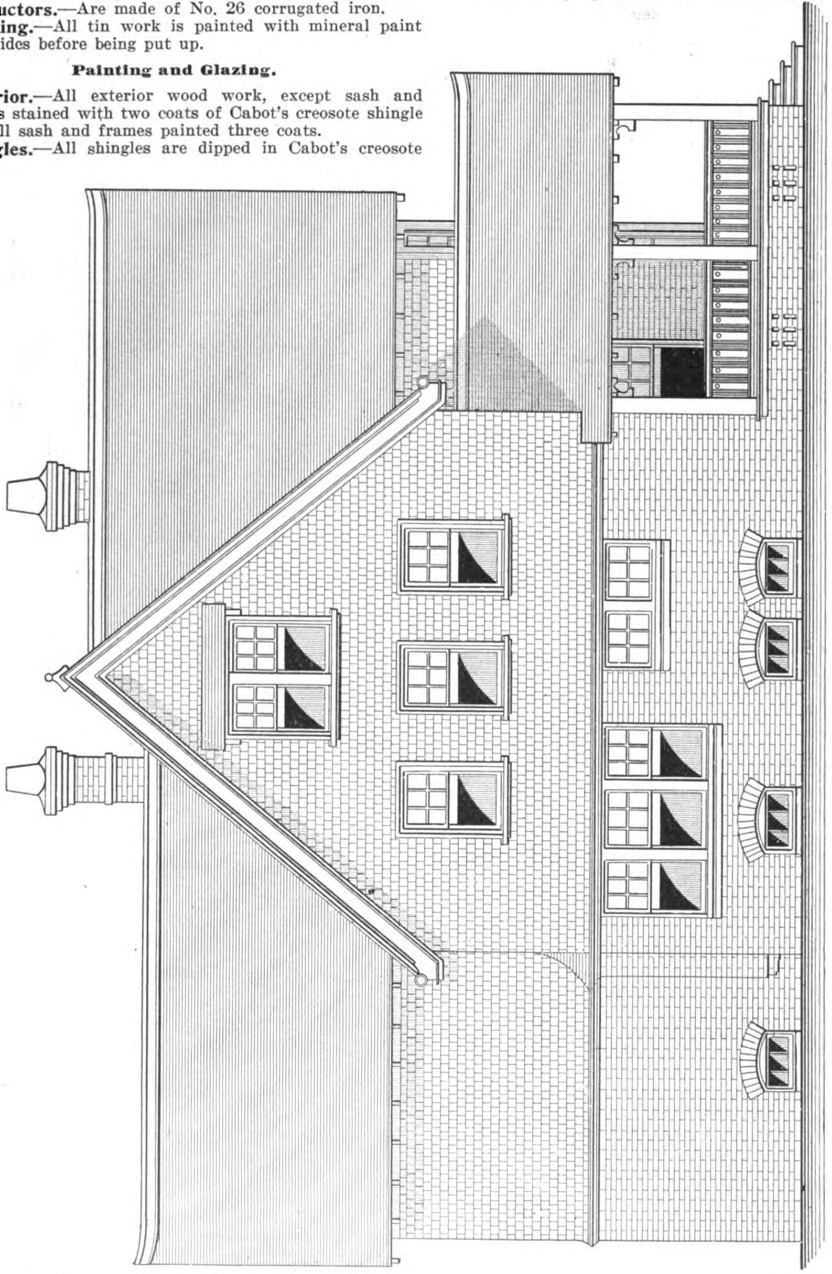
Drains.—All drains of best quality vitrified clay.

Stop Cocks.—Each separate riser has stop cock, check and waste.

Street Washers.—A street washer at front and rear of building is provided.

Meter.—A ¾-inch Worthington disk meter is put in.

Soil Pipes.—All soil pipes are heavy cast iron, with lead caulked joints.



Competition in $6500 Houses.—Second Prize Design.—Side (Left) Elevation.—Scale ⅛ Inch to the Foot.

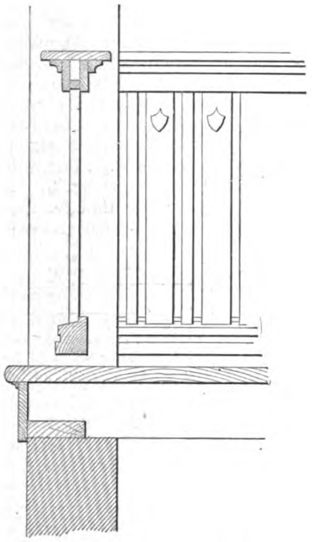
Waste Pipes.—All waste pipes are 2-inch extra strong lead. For icebox separate waste has been provided.

Ventilation, Etc.—The entire work is done in accordance with the rules and regulations of the City Plumbing Department.

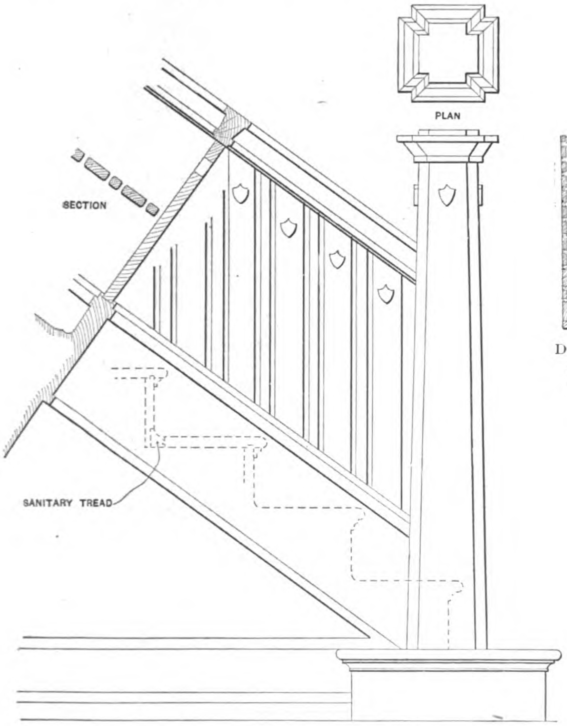
Wash Basins.—These are first quality white enameled iron, with back and apron.

Water Closets.—Second and third floor closets are best tank closets. Cellar closet automatic wash down.

Trimmings.—All trimmings are nickel plated, except for kitchen and laundry tubs, where they are brass.

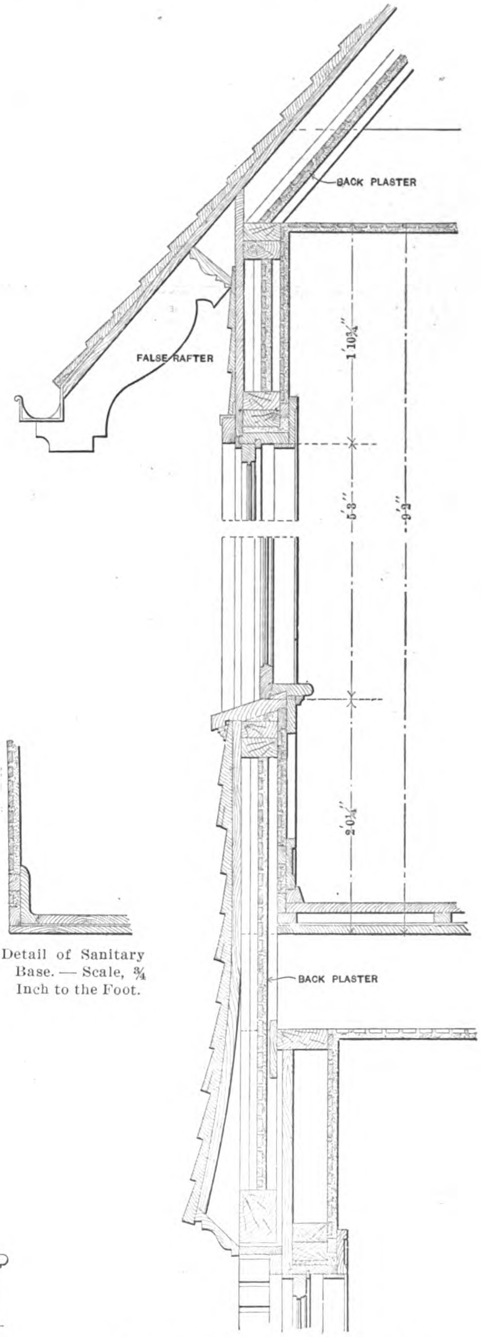


Details of Balustrade on Porch.—Scale, ¾ Inch to the Foot.



Details of Main Stairway.—Scale, ¾ Inch to the Foot.

Detail of Sanitary Base. — Scale, ¾ Inch to the Foot.



Section through Outside Wall of Building.—Scale, ¾ Inch to the Foot.

Competition in $6500 Houses.—Second Prize Design.—Miscellaneous Constructive Details.

Laundry Tubs.—These are made of slate.

Kitchen Sink.—Is first quality white enameled iron, with Tennessee marble top, back and end.

Hot Water Boiler.—A 40-gallon hot water boiler is provided in cellar, connected complete with domestic hot water heater.

Bathtubs.—These are first quality white enameled iron.

Gas Fitting.—The entire house is piped for gas fitting and separate fuel gas is run through bathrooms, kitchen and laundry.

Hot Water Heating.

The entire house is heated with hot water. Boiler and all pipes covered with magnesia covering.

Exterior Color Scheme.

The shingles of roof have been stained a dark moss green. The entire balance of shingle work and wood work, with exception of frames and sashes, was stained a dark brown. Cabot's creosote shingle stain was used and all applied so that the grain of the cypress in verge boards, belt courses and timber construction was not in any way obscured. The frames and sashes of windows were painted cream color.

The first story, as well as a portion of basement above grade, was built of a semivitreous paving brick laid with ½-inch wide joints in a decided cream mortar.

Estimate of Cost.

The following figures of cost were furnished the authors of the design by contractors who agreed to do the various parts of the work for the sums specified:

MASON WORK.

Brick	$505	
Excavating	100	
Cement floors	125	
Mantels and chimneys	125	
Sills, footing	70	
Labor, &c.	346	
Total		$1,271

PLASTERING.

Lathing and plastering		479

CARPENTER WORK.

Lumber	$785	
Factory work	1,190	
Sash weights, paper and hardware	150	
Trimming hardware	100	
Weather strips	20	
Labor	850	
Total		3,095

PLUMBING AND GAS FITTING.

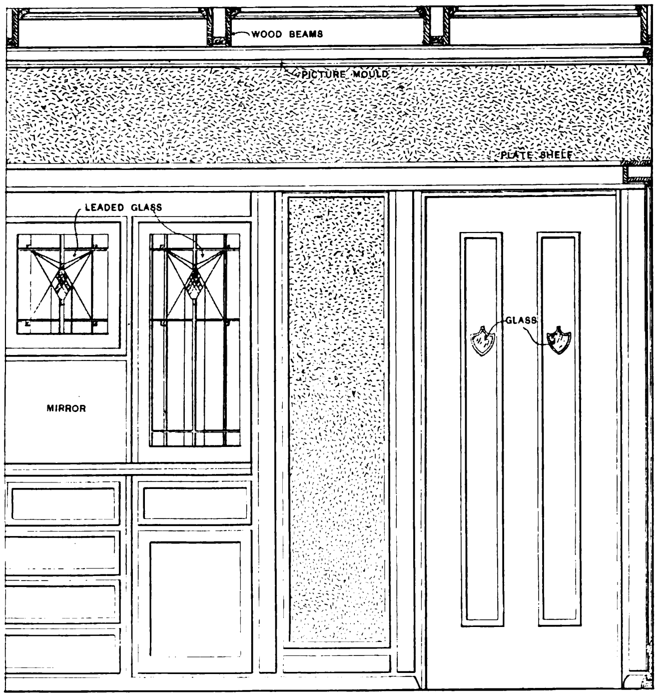
Plumbing, sewerage and ventilation	$323	
Gas fitting	53	
Total		376

PAINTING AND GLAZING.

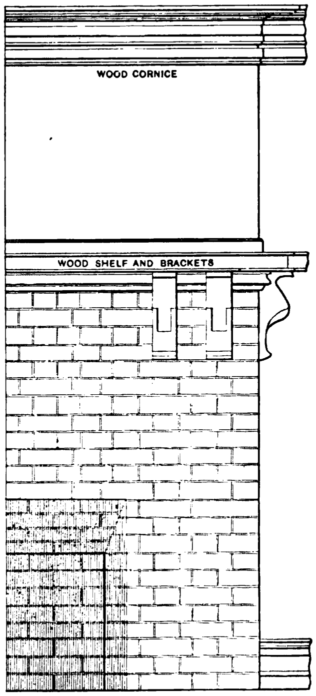
Painting	$234	
Glazing	200	
Total		434
Tinning and galvanized iron work		201

RECAPITULATION.

Excavations	$100
Mason work	1,171
Carpenter work	3,095
Plastering	479
Painting	434
Plumbing	376
Tinning and galvanized iron work	201
Hot water heating	432
Electrical work	64
Total	$6,352



Half Elevation of West Wall of Dining Room.



Half Elevation of Mantel.

Scale, ½ Inch to the Foot.

Competition in $6500 Houses.—Second Prize Design.—Miscellaneous Constructive Details.

The builders' certificates accompanying the estimates furnished above were signed as follows: That for the mason work by J. P. Jones, Ivanhoe place and Summit avenue; that for the lathing and plastering by William Gregory, 812 Jackson street; that for the carpenter work by John Klaeser, 548 Nineteenth street; that for the plumbing and gas fitting by C. J. Fox, 616 Grand avenue; that for the painting and glazing by Robert Harper & Sons, 446 City Hall Square; that for the electrical work by the Herman Andrae Electrical Company, 225 West Water street; that for the hot water heating by George A. Brown & Co., 287 Fourth street; that for the tinning and galvanized iron work by William Hammann, 752 Fourth street, all of Milwaukee, Wis.

◆

THE attractive building which is nearing completion at the corner of Fifth avenue and Thirty-ninth street, New York City, is to be the home of William Knabe & Company, the well-known piano manufacturers. The structure is of the Renaissance type of architecture and is built of steel, stone and brick. The first two stories are of gray stone and plate glass, Doric columns extending to the third story. The building is 170 feet in hight, with a mansard roof, and has a frontage of 55 feet in the avenue and 125 feet in Thirty-ninth street. The building will be heated by exhaust steam, and in the basement will be two Babcock & Wilcox high pressure boilers of 150 horse-power each. In conjunction with the electrical equipment, there will be a storage battery of sufficient capacity to run one elevator at night, including the necessary night lighting. That portion of the building not used by the piano people will be rented to architects, painters, photographers and others of an artistic nature.

GREENHOUSE CONSTRUCTION.

By A. S. Atkinson.

GREENHOUSE construction is rapidly growing in this country, and the demand includes the very small houses used by amateurs for flower and vegetable culture as well as the expensive ones for professional florists or for large estates. As a special line of carpentry designing and construction it is important that some of the most modern features should be considered, particularly in view of the fact that architects and engineers have combined to secure results of a highly gratifying nature at a minimum of expense. Thousands of owners of country homes look forward to the time when they may be able to build a small, inexpensive greenhouse where winter fruits and vegetables can be started early in the season and flowers can be kept in bloom right through the cold weather.

The demand for such inexpensive greenhouses far exceeds what carpenters and architects imagine. A great many amateur flower growers would consider the building of a small greenhouse if plans could be presented to them showing that practical and efficient buildings could be put up for a small sum. The question of deciding the cost and drawing plans to suit the needs of almost any country home is a nice one, and upon its proper solution depends the popularity of any contractor's work. A good, serviceable greenhouse can be constructed all the way from $75 up to $1000. Some have even been built for less than $75, and the writer has in view one which cost less than $70.

Such a greenhouse, however, depends partly for its cheapness upon securing second-hand sashes at a nominal price and upon the relative low cost of lumber. The $70 greenhouse was built in a part of the country where lumber was cheap, and where the climate was so mild that an ordinary heating stove was sufficient to keep the temperature up to the right degree. The house was only 10 x 15 feet in dimensions, and the sloping roof facing the south side was supplied with eight hot bed sashes purchased second-hand at $2 apiece. The sides of the house were constructed of double pine walls, lined between with building paper. The foundations of the house were natural stone, with second-hand bricks laid in mortar on the top. It required only 520 feet of pine boards to put the house together, and these cost only $1 per 100, so that the lumber item was not great. This did not include the cost of logs for sills, nor the glass doors. The labor item was only $10, for most of the work was done by the owner. Such a $70 greenhouse, however, proved most serviceable, and in one season upward of 80 dozen tomato plants, 700 cabbage plants, five dozen onions and a considerable quantity of early lettuce, radish, egg plants and cauliflowers were raised in it.

Two Types of House

The demand to-day is for two distinct types of greenhouse. One is a comparatively cheap wooden structure, costing $100 and upward, for small country homes where amateurs delight to dabble in the early culture of flowers and vegetables. Such houses are usually heated with a coal stove or by a steam radiator connected by a pipe from the heating system of the house. This latter method can be adopted only where the greenhouse takes the form of a conservatory located at some convenient wing of the house. Such a small greenhouse located 20 feet from the house was heated by steam from the main plant through a pipe running underground from the cellar and entering the greenhouse directly in the middle. By running the supply steam pipe under the ground, and covering it with asbestos and magnesia, with canvas outside, there was no danger of freezing or loss of much heat through radiation. So far as the consumption of coal was concerned it could not be ascertained that any great increase was made to heat the greenhouse, although it is more than likely that there was.

Where no way of connecting the steam pipes from the house can be discovered, the ordinary coal stove is sufficient; but this must be located in the middle of the greenhouse, or possibly a little to the north or northwest part. The stove pipe should have a long elbow, if possible, to increase the radiating surface, but only so far as to insure perfect draft. Anything but a smoky stove for a greenhouse. The plants do not like smoke and coal gas any more than the inhabitants of the living house.

A 15 x 20 foot greenhouse can be constructed for from $100 to $150, depending upon the quality of the material used and the price of lumber, sash and labor. It is better to make an excavation of at least 1 foot below the surface, so the house will be low down and present less surface to the wind. A 2-foot excavation is even better. Then the foundation walls will be placed below the surface, and on the outside manure and litter can be piled up 2 feet against the sides. This will make 4 feet of the house amply protected. Lay two courses of bricks or stones, and lay the sills on the top. Two by four inch studs should form the frame work of the walls. The studs should be set 24 inches, and ⅞-inch hemlock or pine boards should be nailed to them. Between the two walls good waterproof building paper should be fastened vertically. The air space between the walls should be at least 6 inches. This can be left empty or filled with manure, sawdust or shavings. Where shavings are cheap they add greatly to the warmth. Manure packed down firmly also makes a good filling.

The Floor Construction.

The floor of the greenhouse is left untouched. The soil should be packed down firmly and covered with coarse gravel or cinders. This makes a better flooring than boards or concrete. It is always dry and in good condition. Water dripping from the boxes and pots will leach through such a floor and cause no surplus moisture. It is better to spread 1 foot of such loose sand or cinders over the surface to make a thoroughly dry floor. Outside of the greenhouse manure, leaves, straw or litter should be piled 1 or 2 feet high, and this will prevent any wind or cold from getting in under the foundation. An additional precaution should be taken by running a line of foot wide boards around the inside base of the walls, attaching them by short cleats 12 inches long to the studs. The space inside should be filled with manure or sawdust.

The roof of the greenhouse should slope toward the sun at an angle of 45 degrees. The frames for the sash should be supported on 2 x 4 beams running from the top of the back walls to the front side about 3 feet from the ground. The size of the frames depends upon the sash. If the sashes are already glazed and second-hand they should be fitted, and the supporting frames made to suit them. If they must be made at home stock sash and frames should be selected. Double sash are necessary to economize in heating the house. Every other one should be worked on a pivot or slide in a groove so that ventilation can be had. Ordinary double doors can be used for the house. Second-hand doors answer the purpose. The inside of the greenhouse can be fitted up to suit the needs of the amateur florist. Light and dark paper curtains made to pull up and down inside of the house are much better than paint on the glass. Light can be regulated to suit the needs of any weather in this way. Flower benches should run down the middle of the greenhouse, and also on either side. On the north side palms, ferns and semi-hardy plants should be stored, and the south or warm side should be reserved for tender plants and seedlings. Such a greenhouse can be built complete for $100 to $150, with coal stove costing only $5 and second-hand sashes $2 to $2.50.

A more pretentious greenhouse requires greater study of details and the working out of heating systems appropriate to the needs of the owner. The heating apparatus should first be decided upon. Hot circulating water or steam are best suited to greenhouses costing from $300 to $1000. Such a system must either be an independent plant or connected with the house plant. Where the former must be chosen the cost of installation will be from $150 up. If connections can be made with the house steam plant the total cost of equipment should not amount to

more than $25 or $40. Underground pipe running 20 or more feet to the greenhouse would carry the steam sufficiently without materially affecting the house heating, but beyond 20 feet a higher head of steam would be needed. The distance this steam can economically be carried to heat a greenhouse is a little debatable, but the writer has seen a greenhouse thus heated through 100 feet of piping. The protection of the pipe by nonconducting material, however, is essential, or else the waste of steam and heat will be considerable. Hot water heating in this way is not so simple.

With the feed pipe once mapped out, and the heating pipes drawn to scale for use under the different benches, the greenhouse itself can be constructed without much difficulty. In a pretentious greenhouse of this character a mean winter temperature must be maintained of 65 degrees. Qwners willing to invest $500 in a greenhouse expect to raise tender hothouse plants, such as carnations, violets and roses. The house should run north and south, and have a peak roof, with glass on either side running down to the foundations. The heating must therefore be sufficient to keep the temperature up on the north and west side during cold, windy nights. The steam pipe should enter the greenhouse on this cold side, and the pipes be arranged so that the heat will be greatest here.

Concrete Block Construction.

A good many innovations have been attempted with greenhouses of this style. One of the most popular and most satisfactory is the employment of hollow concrete building blocks for the foundations and walls. A trench is dug 1 foot or 6 inches deep, and the concrete blocks laid in it. The wall is built up from this trench 2 or 3 feet above the surface level. From the top of this wall the wooden frame work supporting the glass sides and roof springs and carries the whole load of the structure. Four by six studs 3 feet long are attached to a 3-inch sill of pine or oak, the studs being set every 18 inches apart. The top sill of the walls is fitted in position, and the roof beams which carry the sashes come next.

Where only an overhead light is needed the walls of hollow concrete blocks are run up from 4 to 6 feet, and the rafters of the roof are set directly on them. The concrete blocks properly set in good mortar make a complete windproof wall. The space of air in the hollow blocks serves all the purposes of double wooden walls. The hollow blocks make the interior of the house very dry and equable in temperature, and outside conditions affect the interior very little. The durable nature of the concrete blocks is also a factor in their favor. Such walls will last a lifetime and require no painting and repairing. The finished effect is also important. Hollow concrete walls for a greenhouse can in most localities be constructed for only a slight advance over the cost of building double wooden walls properly papered inside.

Where a separate heating plant is used for the greenhouse a complete walled-in extension should be constructed on the north side, of hollow concrete blocks. The roof is shingled, with the rafters resting on the concrete walls. A window on either side and double doors on the north side complete the structure. The walls of the greenhouse are built continuous with the walls of the heating house, and with no break there is little chance for outside cold air to enter. The furnace should rest on a concrete foundation sunk a few feet in the earth. This practically makes a fireproof inclosure for the steam plant, and the pipes radiating from it follow the concrete walls of the greenhouse so that a maximum of heat is obtained at a minimum of consumption of coal. The coal bill of such a greenhouse is from 10 to 20 per cent. lower than that required for heating ordinary wooden greenhouses.

Ordinary bricks and stones cost about the same as the hollow concrete blocks and they do not give the same excellent service. Neither of these building materials keep out the cold so well as the concrete, and in the summer they do not retain the low temperatures so well. With the top of the greenhouse protected by shades and the walls running up to the eaves of the roof it is possible to secure a cool temperature inside when the outside air is blistering hot. Thus the hollow concrete greenhouses serve a double purpose.

Where cement and clean, sharp gravel can be obtained relatively cheap it proves advantageous to build even the smaller greenhouses out of hollow concrete blocks. A lean-to greenhouse of this character, 15 x 20 feet, can be constructed at about the price of wooden houses, and the solid concrete wall on the north side proves a most efficient barrier to the cold winds. In such a house early forcing beds can be used to great advantage. With nothing but fermenting manure for supplying the heat, early lettuce, radishes and other seeds can be started.

Value of Small House.

Here is a new field that needs to be exploited in any suburban town or country village where hollow concrete blocks are manufactured cheaply. It simply requires practical demonstration of the value of such a small greenhouse to induce many to adopt it. Such demonstration is worthy of trial. In one New England village where it was tried upward of 20 were constructed within 18 months, and many more have been ordered for immediate erection. The permanent character of the house and the relatively low cost of annual repairs appeals to the average householder. Stock frames and sashes or second-hand materials greatly reduce the cost and difficulty of construction.

There is unquestionably a wide growing popularity in greenhouses, hothouses and cold frame beds in our Northern States, both for amateur and professional use. The pleasure and profit obtained from them far more than repay the initial expense. Spring comes earlier to the owners and summer lingers well into the winter, so that our long Northern winter is robbed of much of its unpleasant features. The adaptation of the permanent greenhouse to modern country homes of moderate size is thus an innovation that is giving to the poor many of the pleasures and advantages of the wealthy. Here one can raise his own mushrooms for table use or grow crops for the market when the delicacies are retailing as high as a dollar or two a pound. In one successful season enough profits can often be realized from a crop of mushrooms to pay for the entire cost of greenhouse construction.

Byzantine Architecture.

Architecture in particular found support and patronage at Constantinople even in those ages when the plastic arts had sunken into a state of barbarism and almost entirely disappeared. We read in the histories of the Byzantine emperors of the seventh, eighth and ninth centuries accounts of buildings of astonishing magnitude, splendor and beauty, says an English writer. These qualities especially distinguished the palace of Justinian II among the numerous edifices erected by him; the walls of it were overlaid with gilded bronze and with marble slabs, and the entire floor was of marble. He, however, was surpassed by one of his successors, Theophilus. This emperor built the celebrated Bucoleon, in which stood a bronze lion seizing a cow; the summer palace Bruos, the palace named the Pearl, and Pentapurgion, the Karian palace and the Triconchus. To the last building adjoined the colonnade of the Sigma, and an acoustic structure was contiguous to the latter. At the Triconchus and Sigma Theophilus constructed a fountain, the basin of which was set in silver. Below it was an eminence on which seats could be placed for his courtiers, and to which there led up a flight of steps of white marble from Proconnesus. The fountain was supported by two slender columns, on which stood two bronze lions from whose mouths water flowed, for the purpose of diffusing coolness over the open ground in front of the Sigma.

The Oldest House in America.

It is generally agreed that the oldest house in America stands in St. Augustine, Fla., on a tiny, narrow thoroughfare near the center of the old city. This house was built in 1564 by the monks of the Order of St. Francis. It is a solid structure, built of coquina, a combination of seashells and mortar that is quite indestructible. In the early days of the Spanish settlements this substance was quite plentiful in the vicinity of St. Augustine, the walls of the old city gate as well as that of Fort Marion being built of it.

CENTERS FOR ARCHES OF DOUBLE CURVATURE.*—IV.

By Charles H. Fox.

BEFORE proceeding further it will probably be best to describe the generation of the surfaces of which the soffits of the arches may be composed. When speaking of an arch in a circular wall experienced workmen usually make use of the term "circle on circle," no matter as to the form of surface of which the soffit is composed. However, this rule does not obtain among those who have a knowledge of geometrical principles which govern the generation of surfaces. With these men each separate form of arch has a particular name and it takes this name from the form of surface of which the soffit of the arch may consist. Altogether there are an indefinite number of surfaces having different properties, yet for the purposes of descriptive geometry they have been divided into four classes. For the purpose of these articles it will be necessary to speak only of two classes, one of which is called single curved and the other a warped surface. Generally in arches in circular walls the soffit surfaces are comprised of three forms, two of which belong to the class first mentioned and the other to the latter class. The surfaces are generated by lines moving according to some mathematical law. A line which by its motion generates a surface is called the generatrix, and the lines of the surface determined by the different positions of the generatrix are called elements of the surface.

The plane surface or plane is generated by a right line moving along another right line and continuing parallel to itself.

Curves of single curvature are those in which all the points of elementary arcs lie in the same plane. For the purpose of these articles it will be only necessary to speak of two—the circle and the ellipse.

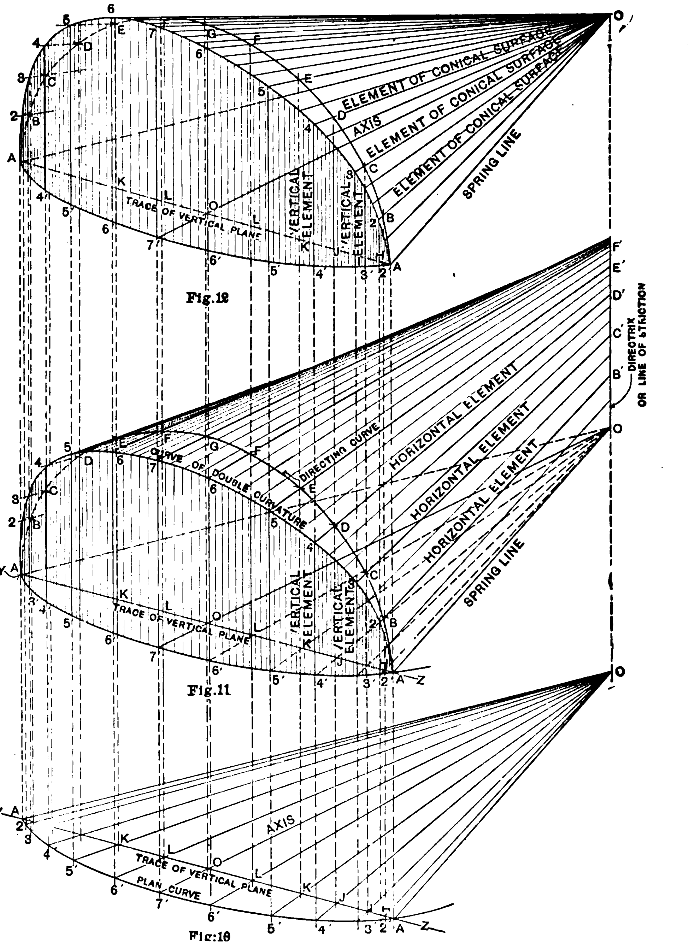
The circle is such a well-known curve that it needs no description.

The ellipse is a curve generated by a point moving in such a manner that the sum of its distances from two fixed points, called the foci, is equal to a given line called the transverse or major axis.

With regard to the generation of curved surfaces it may be stated that there are in arches in circular walls three forms of soffit surfaces, the names of which are, first, the cylindrical; second, the conical, and third the conoidal.

The cylindrical surface may be generated in the following manner: If any curve be taken in space, such, for example, as the semicircle represented by A, B, C, etc., of Fig. 13, and any indefinite right line be drawn through any point of it, as B of the figure named, and the line be moved around the curve constantly touching it and parallel to its first position the surface thus generated is called a cylindrical surface. The curve around which the line moves is called the directrix and the right line is called the generatrix. Any one of its positions, as that represented in B B′, C C′, &c., is called a rectilinear element.

The surface may also be generated by moving the directrix parallel to itself, in which motion all its points continue in the surface; hence a cylindrical surface can be generated by a curve moving parallel to itself. The rectilinear elements of these surfaces are indefinite, but when we wish to consider any finite portions of them they are intersected by planes. The curve formed by the intersection of such planes with the surfaces are called Bases. When the rectilinear elements are perpendicular to the base the cylinder is called a right cylinder; and if this base be a circle, a right cylinder with a circular base. The line drawn through the center of the circular base, parallel with the elements of the surface of the cylinder, is called the axis. The above described cylinder is the one whose surface will be here represented as that which forms the outer and inside faces of the wall in which the arch may be constructed. And it is such a surface as this described which forms the soffit of the cylindro cylindric arch. It takes this name because the surfaces of which the soffit and faces of the arch are comprised are both cylindrical. The problem shown in the diagram Fig. 13 is that of the intersection of two right cylinders, whose axes are at right angles, one of them being vertical, the other being horizontal. The horizontal axis is represented in the line 7 O O′. The surface having the horizontal elements represents the soffit; and that with the vertical elements represents the outer face of the cylindro cylindric arch. The line containing the points A H I J, &c., represents the horizontal trace of the vertical plane which contains the directing curve of the



Figs. 10, 11 and 12.—Diagrams Showing Method of Generating Surfaces of Which the Soffits of Arches May Be Comprised.

Centers for Arches of Double Curvature.—IV.

---

* Copyright, 1906, by Charles H. Fox.

soffit surface. This is also called the opening line, and it is the length of this line, as A A', which determines the width of the opening of the arch at the outside face. Referring now to the conical surface, if we take any plane curve, as for example, that of the semicircle represented by A B C, in Fig. 12, and a point as O, and an indefinite straight line connecting the point with any point on the curve, as a generatrix, and we move the generatrix so that it shall continually contain the fixed point and some point of the curve, it will generate a conic surface. The fixed point is called the vertex. Any one of the positions of the generatrix is called a rectilinear element. This is the surface which forms the soffit of the cylindro conic arch. It takes this name because of the cylindrical surface of the face and that of the conic surface of the soffit. A representation of the intersection of these surfaces is given in the diagram Fig. 12. Expressed in the language common in the shop, it shows the soffit surface of an arch in a circular wall, having jambs and circular head splaying equally all around.

For the purpose of these chapters we need only to describe the generation of one other form of surface, that of a right conoid, which forms the soffit of the radiant arch. This is a surface which, too, may be generated by a right line, but unlike the other forms of surface described above the positions of the generatrix are not in the same plane. Therefore it becomes a "warped" or "twisted" surface. Although both surfaces—that is, the single curved and the warped—may be generated by a right line, yet this latter class of surface is entirely distinct from that of the first described.

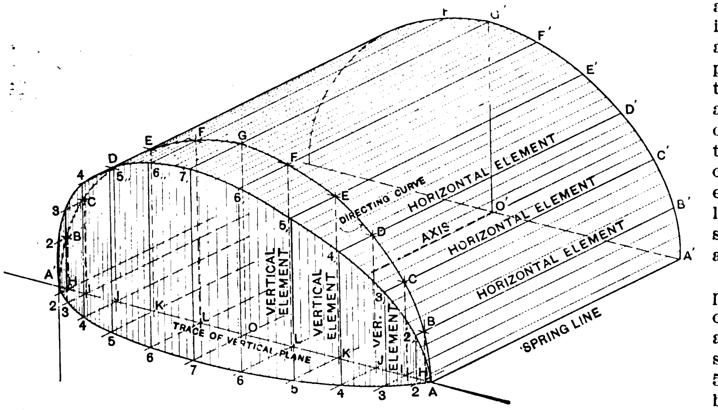


Fig. 13.—Diagram Showing Intersection of Two Cylindrical Surfaces.

Centers for Arches of Double Curvature.

In the single curved surface the consecutive positions of the generatrix are in the same plane, so that the surfaces may be developed with as great an exactness as that of any plane figure. In the warped surface, the right line generatrix not being in the same plane, it is only possible to develop the surface approximately near to truth. This difference in the manner of generation may to many seem unimportant, yet it gives to the surface a very different form and essentially different properties. Referring to the diagram Fig. 11, we may take the curve represented in A B C, &c., as that of a semicircle situated in a vertical plane, of which we may take the line Y Z of Figs. 10 and 11 to be the horizontal trace. Let the point O, on the perpendicular O 7, be the horizontal projection of a vertical line through O. Now let this vertical at O and the semicircle A, B, C, &c., be taken as the directrices of a surface, generated by moving a right line parallel to the horizontal plane, and in each successive movement touching the vertical at O and the curve of the semicircle, it will generate a conoidal surface. This belongs to a particular class of warped surfaces called conoids because of the analogy existing between them and the surfaces of cones. When, as at this example, the right line directrix, as O 7, is perpendicular to the horizontal plane—that is, to the plane director—the conoid takes the name of right conoid. The directrix the name of the line of striction. It takes this name because it contains the shortest distance between the elements, so that the surface is as it were cramped or compressed along this line. This point is clearly shown in the diagram Fig. 8, for the directing curve is divided in A, B, C, &c., into arcs of equal length, but as may be seen, the elements passing through these points do not at their intersection with the directrix divide it into lengths as that of O B', B', C', &c., of equal divisions.

It may also be noted that in the two forms of arch represented in the diagrams Figs. 10, 11 and 12 the jambs at the springing line radiate toward the center with which the plan curves represented in 1, 2, 3, &c., may be drawn. Also that the projections of the elements as 2' B, 3' C, &c., as represented at the plan of the soffit surfaces, radiate toward the point O. In other words, the one plan may be made to answer for the two forms of arch, that of the cylindro conic and that of the radiant, provided the width of the opening and the length of the plan radius are equal at both arches.

(*To be continued.*)

◆

Cost of Laying Concrete Blocks.

The cost of laying concrete blocks, especially of the two-piece system, has been the subject of no little discussion and comment in various parts of the country, and while the work in some cities is claimed to belong to the masons and also to the bricklayers, the point is made that it is not properly the work of either, but should be of a separate and distinct class. In order to obtain views of leading interests in different sections of the country, inquiries were made by an exchange as to the prices paid for laying concrete blocks, two-piece system, and the following replies are of interest in this connection:

A Syracuse plaster concern expresses the opinion that 7 to 7½ cents per block, mortar included, is a fair price. A Cleveland concern states that it is paying contractors 5 cents a cubic foot for laying up blocks, and that this is considered sufficient to give them a fair profit on the work.

The agent of a hydraulic stone concern, writing from Chicago, says: "In this city contracts have been taken for 5 cents per block for laying them in the wall. Cleveland plant has contracted on different buildings for the complete erection of the building for 5 cents. We have seen the blocks laid in the walls by masons that were paid 60 cents per hour, each mason having a helper at a cost for labor of less than 3 cents per block. To this must be added the cost of helper for putting the blocks on the scaffold. This is a very reasonable price for laying these blocks in the wall, and the contractor that takes the contract at that figure and works can make a fair margin of profit."

A writer in Denver, Col., identified with the hydraulic stone business, says a fair average price for laying blocks, including mortar, is from 6 to 7 cents per 12 x 24 inch block.

◆

THE United States Department of Agriculture has just issued what is known as bulletin No. 37, entitled "Recent Practice in the Erection of Lightning Conductors," the matter having been prepared under the direction of Willis L. Moore, Chief of the United States Weather Bureau, by Alfred J. Henry, professor of meteorology. An important feature of the pamphlet is found in the reference to the practice of the Federal Government in the erection of lightning rods and to the application of lightning conductors to farm and residence buildings. Attention is called to the apparent decrease in the use of lightning conductors, and in conclusion is given the report of the Lightning Research Committee, with an appendix describing the latest practice abroad. The price of the bulletin is 10 cents per copy.

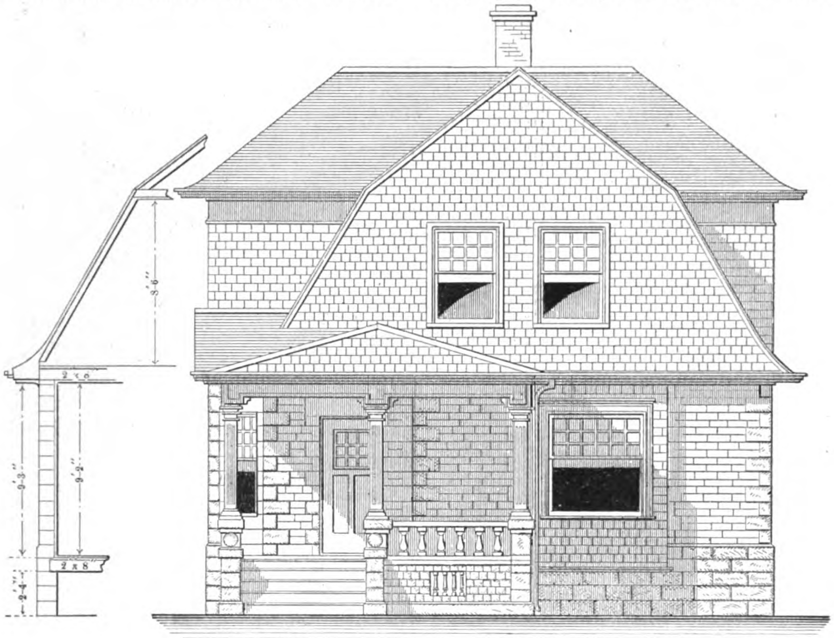
DWELLING OF CONCRETE BLOCK AND FRAME CONSTRUCTION.

(With Supplemental Plate.)

ONE of the half-tone supplemental plates which accompany this issue of the paper shows an exterior view of a dwelling constructed of hollow concrete blocks for the first story and frame for the second, and which in view of the rapidly growing popularity of hollow concrete blocks for the purpose indicated renders the design of more than usual interest and value. The half-tone engraving affords an excellent idea of the appearance of the completed structure, while the plans presented herewith show the disposition of the various rooms. In the opinion of many local architects and makers of hollow building blocks, this is said to be regarded as one of the best concrete jobs in that section of the country, viewed from an architectural standpoint.

According to the specifications of Architect Clair Allen, Jackson, Mich., the foundations are made of 9 x 10 x 32 inch rock face Normandin blocks, with special outside and inside rock face blocks for the corners and for the octagon bay window. The water table has a 2-inch wash and a ¼-inch drip and is 9 inches high by 11 inches in width. The first story walls are of Normandin blocks, plain, 4½ inches high and in lengths of 8, 12, 16, 20 and 24 inches by 8 inches in width, laid up in random style with ¼-inch joints. The corner blocks above the water table "quoins" in the stone work project ¼ of an inch and are beveled for ¾ of an inch, making the total extension of the quoins 1 inch. This arrangement sets off the 4½-inch block work in good shape. The windows and doors on the first floor have these quoins running alternately 4 x 8 x 9 and 8 x 8 x 9 inches on each side. The sills are plain and the caps are 9 inches high, 9 inches wide and in various lengths up to 5 feet 8 inches, all reinforced with angle iron. They are made on the quoin order also, and have the same bevel extensions at the corners.

Each of these caps, including those over all doors and windows, have molded thereon an ornamental scroll and shell design, which is about 8 inches high and 32 inches long. Each of the 9-inch high and 4½-inch Normandin blocks have vertical air chambers of a width about equal to one-third of that of the block. Some of these air chambers are receptacles for the wiring and piping of the house. In addition to the vertical air chambers in the blocks each bridge of concrete on the top of a block was notched in an oval manner to a depth of about 2 inches, which was done by the men at the time the work was in progress. This left an opening on each end of the block as well as in the center, in such a manner that when a block was laid on top of it there was left a horizontal air chamber on each course as well as a vertical one. By this means a circulation of air is permitted, as the first course in the cellar has openings in different places and the air passes upward until it reaches the framework, which is fastened to the top course of blocks. In the wall plate holes 1½ inches wide are bored at very short intervals, which allows the air to pass into the attic, resulting in an absolutely dry wall in the cellar and first floor, notwithstanding the fact that the latter is furred and lathed. The inside of the cellar is washed with hydrated lime, rendering it very clean and sanitary. The piers in the cellar are of 16 x 16 inch Normandin blocks 9 inches high. The ash bin and coal bin in the cellar are also made of these blocks, while the fruit and potato room are of Favorite sand cement brick. The foundations for the house, including those for the boiler and grate, rest on 18 inches of grouting, mixed in the proportions of ½ and 4. The porch consists of fluted concrete columns with bases and capitals, there being two styles of balusters. The square balusters are 11 inches high and 4 inches square. The work between the floor and the water table is of Favorite sand cement brick, rock face. The chimney is of the same brick, rock face and plain alternating.



Vertical Section and Front Elevation.—Scale, ⅛ Inch to the Foot.

Dwelling of Concrete Block and Frame Construction.—Claire Allen, Architect, Jackson, Mich.

The second story of the house is of frame construction, the exterior walls as well as the roof being covered with cedar shingles, first treated with two coats of Cabot's satin.

The first story is finished in oak and the second in Georgia pine. The finish of the bathroom is in maple, with modern equipment throughout.

The residence here shown was erected in Jackson, Mich., for Sid. L. Wiltse, secretary of the Cement Machinery Company of that city, maker of the "Normandin" hollow concrete block machines. The total cost

of the concrete work is given at $620; excavating and grading, $60; the carpenter work, tinning and painting, $2000; the plumbing and heating, $600; the fixtures, $100, and miscellaneous, $40.

The house is heated by means of a "Model" steam boiler, made by the Kellogg-Mackay-Cameron Company, Chicago, and installed by H. S. Millard & Co., Jackson, Mich. The contractors for all the concrete work were Wiltse, Peeler & Town, and the contractors for the carpenter work, tinning and painting were Bradt & Lusk, all of Jackson, Mich.

It may be interesting to state in this connection that the excavation was started and the first block made August 15, 1905, and the residence was completed December 15 of the same year.

Heating and Ventilating a Notable Church Building.

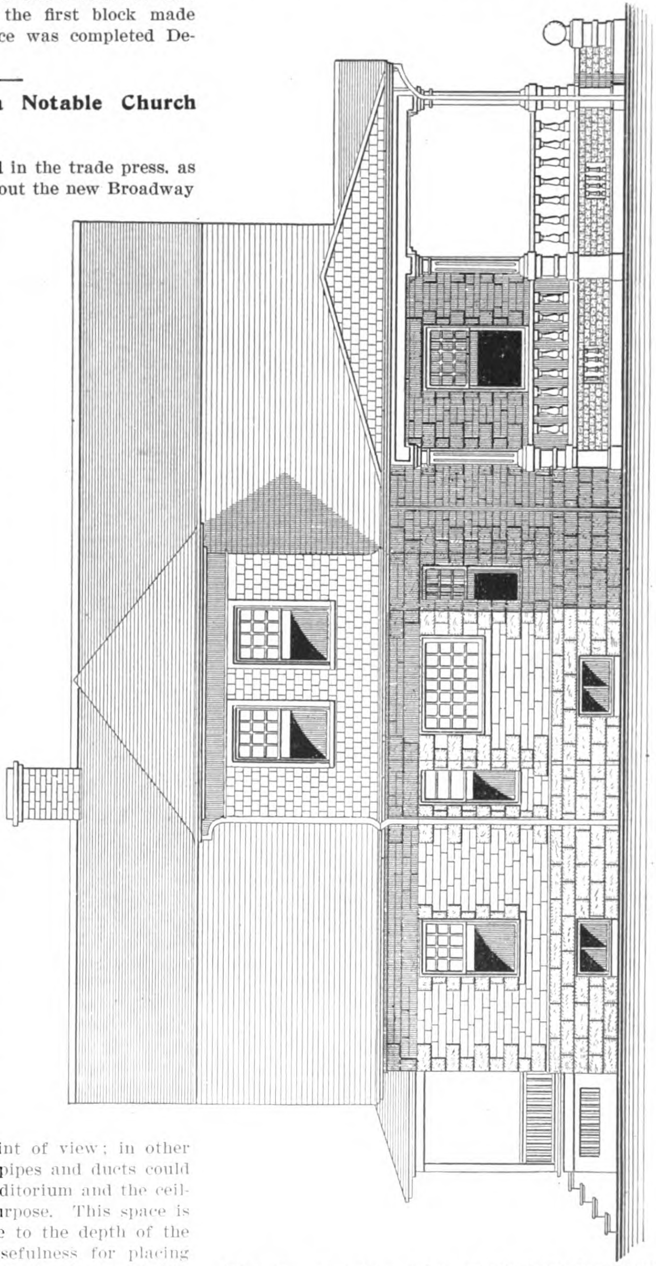
A great deal has been published in the trade press, as well as in the daily newspapers, about the new Broadway Tabernacle, completed not long since at a cost of about $1,000,000, at Broadway and Fifty-sixth street, New York City. The structure is notable by reason of the fact that one portion of it is ten stories in hight and that within its walls are five halls and chapels and 20 assembly rooms and parlors. It is the first New York church of distinctive skyscraper construction, and not the least interesting feature in connection with it is the methods employed for heating and ventilating it. At the recent meeting of the American Society of Heating and Ventilating Engineers, held in New York, C. Teran read a paper describing how this was done, and as it forms a valuable contribution to what has already appeared in these columns regarding the notable building in question, we present this paper herewith.

The heating and ventilating of a church auditorium has always been an interesting problem, for there are conditions found and difficulties to overcome in an auditorium of this kind that do not occur in the ordinary building, such as large glass surfaces, which are the source of cold drafts, little floor space for placing radiators, the necessity of placing radiators near seats, making these seats undesirable. In this case there was one difficulty to contend with—namely, that under the auditorium there is a hall, which had to be left free of pipes and other objectionable features from an æsthetic point of view; in other words, there is no cellar in which pipes and ducts could be placed. A space between the auditorium and the ceiling below was provided for this purpose. This space is about 3 feet deep, but as it is due to the depth of the girders that carry the floor its usefulness for placing pipes and ducts was limited, as can readily be understood.

After carefully considering all these points it was desired to use the blast system of heating, with mechanical exhaust and automatic temperature control for the auditorium, and direct radiators controlled by hand for the vestibules. The blast system was considered the best in this particular case for the following reasons: 1. Low cost of installation. 2. Radiators are done away with. 3. From a sanitary point of view the fact that the place cannot be heated without at the same time ventilating it. 4. Even distribution of heat.

The seating capacity of this auditorium is 1500. The apparatus was designed to supply 25 cubic feet of air a minute per person to 1600 persons, or a total of 40,000 cubic feet of air a minute. It may be mentioned that in this case 25 cubic feet a minute per person was about the maximum amount of air that could be introduced without causing drafts and noise, and this by introducing a large proportion of the air through top inlets. The entire use of bottom inlets would have been impossible without causing drafts, or considerably reducing the amount of air supplied. A three-quarter housed centrifugal fan is used to supply the air. This fan has a blast wheel 9 feet in diameter by 4½ feet wide and is driven by a direct connected motor. The fan is calculated to deliver 40,000 cubic feet of air a minute at 130 revolutions per minute.

The heat transmitted through walls, windows, &c.

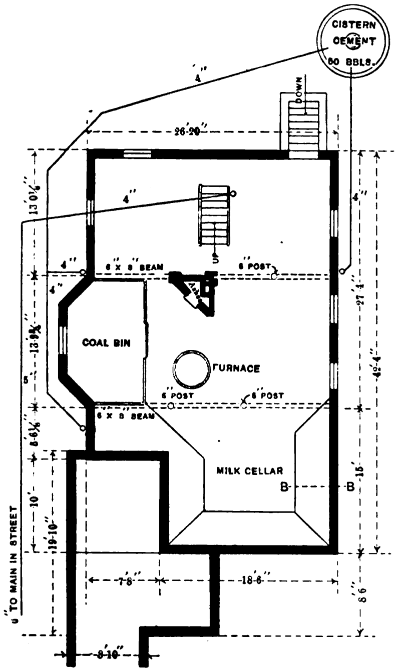


North Side (Left) Elevation.—Scale, ⅛ Inch to the Foot.

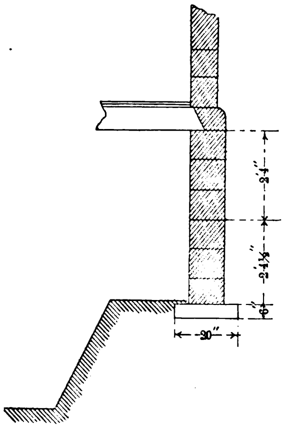
Dwelling of Concrete Block and Frame Construction.

was calculated to be 340,000 heat units per hour, with 70 degrees F. difference between the inside and outside temperatures. Given these conditions, the incoming air would have to be heated to 78 degrees F. to supply this loss. This is accomplished by drawing the air through a heating stack consisting of ten two-row sections, or coils, of the miter type. These coils are built in staggered rows of 1-inch pipe, and the stack contains 7500 linear feet. Each section has two steam and one return connection.

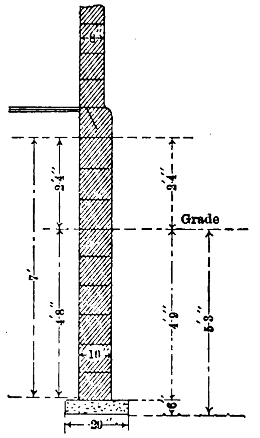
The air is taken from a court at the ground level, and for this reason the intake was made large, to insure a low velocity of the air in the immediate outside vicinity. This opening is fitted with a wire screen and louver damper. Through this opening the air is directly admitted to the filter room. The filter is of the "V" type, made of galvanized iron, with removable wooden frames covered with wire and cheesecloth in the usual manner. The filtering area is proportioned to allow 32 cubic feet of air a minute to pass through every square foot of filtering material.



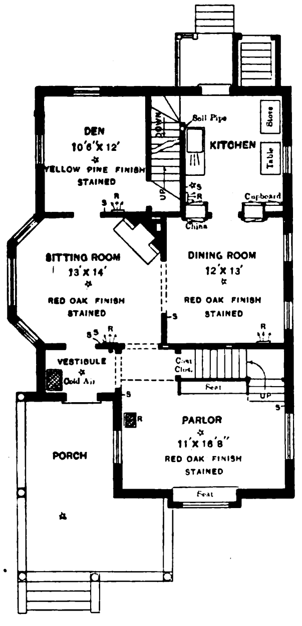
Foundation.



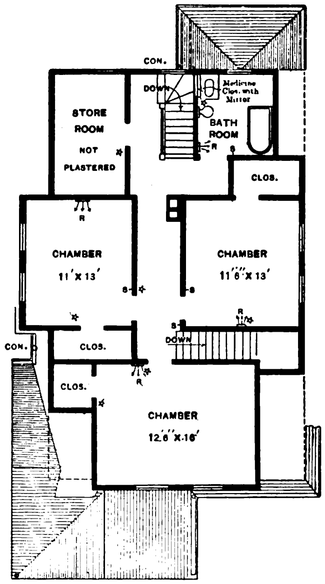
Section on Line B B of Foundation.—Scale, ¼ Inch to the Foot.



Section through Foundation Wall.—Scale, ¼ Inch to the Foot.



First Floor.



Second Floor.

Scale, 1-16 Inch to the Foot.

Dwelling of Concrete Block and Frame Construction.

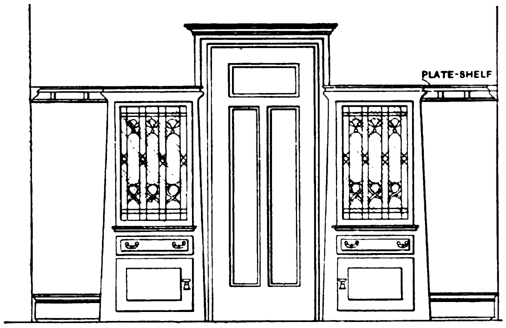
From the filter room the air is induced through the heating stack into the fan, then discharged by this into the distributing ducts and flues leading to the auditorium. The velocity of the air is reduced in the ducts to 1900 feet a minute and in the flues to 900, and finally discharged at 600 through the top registers and 200 through the floor registers. The heat registers are placed from 8 to 12 feet above the main auditorium and gallery floors. There are also heat registers in the floor in front of the large windows, and in the step risers of the front gallery.

The air discharged by the registers in front of windows is intended to counteract the cold air drafts pro-

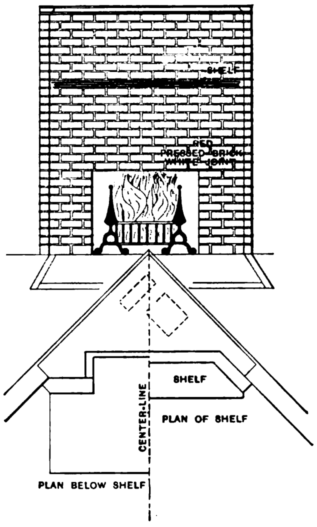
duced by these cooling surfaces. A large proportion of the air is introduced on the same side as the pulpit, so that its travel is in the same direction as the voice of the speaker, thus aiding, or at least not interfering with, the acoustics of the auditorium. The equal distribution of the air is obtained to a large extent by the location of the exhaust openings.

Each pew end on the main floor has an opening near the floor, forming part of the design of the ends of the pews. These openings are connected with the space underneath the auditorium referred to, which is also used as an exhaust chamber. The connections between this chamber and the openings in the pew ends are made by cast iron hoods, placed against the inside of the pew ends, and covering both the opening in the pew end and that in the floor leading to the exhaust chamber. These hoods are provided with controlling dampers to regulate the flow of air through them.

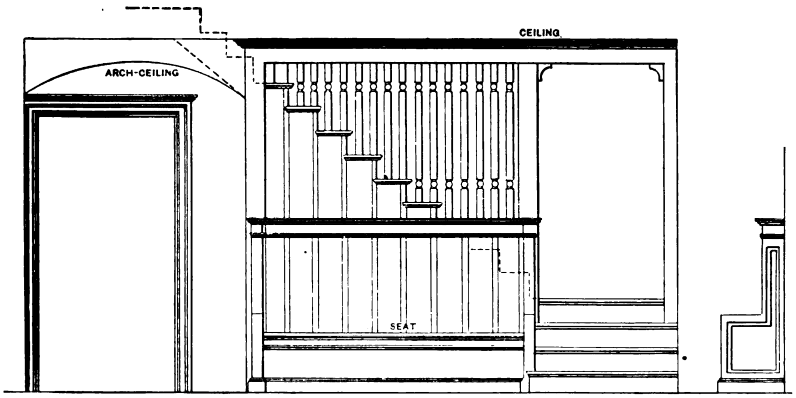
The exhaust chamber is connected at one end to a Blackman exhaust fan 6 feet in diameter. This fan is driven by a direct connected motor and discharges into the open air. It is intended that when this fan is revolving at 300 revolutions per minute it will exhaust 32,000 cubic feet of air a minute, or 80 per cent. of the amount supplied by the blower.



View in Dining Room Showing China Closet.—Scale, ¼ Inch to the Foot.



Mantel in Sitting Room.—Scale, ¼ Inch to the Foot.



View in Parlor Looking Toward the Main Stairs.—Scale, ¼ Inch to the Foot.

Dwelling of Concrete Block and Frame Construction.—Miscellaneous Constructive Details.

When the apparatus is started in operation the air is introduced at as high a temperature as the heater coil will heat it, until the temperature in the auditorium has reached the maximum required, then the air is introduced tempered only until the temperature in the auditorium falls below the normal, when the air is again heated to a higher temperature to supply the loss. This is accomplished automatically by thermo-pneumatic control, as follows:

Three sections of the heating stack have separate steam connections and are controlled by a thermostat placed in the cold air chamber. This thermostat is set to operate at a temperature a few degrees above freezing, about 40 degrees F. The rest of the heating stack is controlled by two thermostats, one placed in the auditorium and set to operate at 65 degrees F., and the other in the main warm air duct, also set to operate at 65 degrees F. Both of these thermostats operate the same set of valves, controlling the inner seven sections of the heating stack. The thermostat in the duct, however, is so connected that it can only act when that in the auditorium has operated to shut off heat, during which period of time it will maintain the air at the temperature at which it has been set. By this arrangement the same stack is alternately used as a heating and tempering coil.

In this, as in all other auditoriums, the heating apparatus is shut down until a short time before the audience is admitted. On this account there is a decided advantage in having the tempering and heating coils combined in one, for when heat is turned on the whole stack is active until the required temperature is attained in the auditorium. This makes the period of heating up shorter than it would be if the tempering and heating coils were separate.

◆

One of the most notable structures contemplated for lower Broadway, New York City, is the annex to the Singer Building, which will tower 593 feet above the street level. This will make it higher than the famous Philadelphia City Hall, the Cologne Cathedral or the Washington Monument.

MATERIALS, METHODS AND TERMS USED IN PLASTERING.

In a recently issued volume of proceedings of the Ontario Association of Architects, there appeared a short chapter devoted to a description of materials, methods, tools and trade definitions used in plastering, the matter having been prepared by W. J. Hynes, on behalf of the Plasterers' Section of the Toronto Builders' Exchange, and at the request of the Toronto Chapter of the Ontario Association of Architects. The object in view in the preparation of the matter was to assist in bringing into use specifications that shall be more nearly uniform than those heretofore employed. As much of this matter is of interest to readers on this side of the border, we take pleasure in presenting the following rather copious extracts, thus affording an opportunity for contrasting American with Canadian methods and terms in this particular branch of the building industry.

No. 1 Wood Lath consists of white pine, cedar or spruce, free from large knots or bark, ⅜ inch thick, 4 feet long, in widths of 1, 1¼ and 1⅜ inch, of uniform dimensions.

No. 2 Wood Lath consists of hemlock, hard pine and culls from white pine, cedar or spruce, of irregular dimensions.

Expanded Metal Lath made from sheet steel, cut and expanded, may be procured either in the naked steel or painted.

Hayes' Metal Lathing is made from sheet steel which is perforated, with the points of perforations turned back to form keys.

For either metal lathing the bearings require to be not more than 12-inch centers.

Gray Lime from Georgetown, Limehouse and Milton is generally used for mortar for the under coats in plastering. It should be well burned and used while fresh.

White Lime from Guelph, Galt, Innerkip and other places is used for the finishing coat. Like the gray lime it requires to be well burned, and should be made into lime putty while fresh.

Plaster.—Made from gypsum, requires to be finely ground and properly calcined. Should be white in color, and of uniform setting properties.

Sand for lime mortar should be sharp and clean, but not too coarse; for cement work, coarse sand is best.

Hair should be long winter cattle or goat hair properly saved.

Fibers have been offered as substitutes for hair, but nothing at present offered answers the purpose.

Nails for wood lathing 1⅛ inches long, of good weight and head. For expanded metal large headed slater's nails. For Hayes' lathing heavy lath of good head.

Hair Mortar consists of gray lime properly slacked and mixed with clean, sharp sand, to which is added sufficient hair to hold the material from falling or wasting through keys of lath work.

Straightening Mortar made same as above with a greater quantity of sand and one-third the quantity of hair.

Coarse Stucco, made from gray lime, or white, as desired, with clean, coarse sand.

Fine Stucco, made from lime putty or white rock finish, mixed generally 1 of lime to 3 of clean, sharp sand.

Lime Putty, made from white lime slacked with a surplus of water, run through a fine sieve, and allowed to stand in vats until fit for use.

Gauging is the term used to describe the admixture of calcined plaster with mortar or lime putty. The larger the proportion of plaster used the stronger the work will be. The same term is used to describe the mixing of cements with mortar, sand, lime or other material.

Portland Cement, gauged with lime mortar, is used generally for outside work and first coat on lath work, the proportion varying according to requirements.

Portland Cement Stucco generally used for outside work and places subject to damp or moisture. When applied on lath, use 1 of Portland, 3 of sand and add 1 of hair mortar. Second coat, 3 of sand, 1 of Portland, and finishing coat generally 2 of Portland to 5 of sharp sand. When used on lathing, metal lath is to be preferred.

Portland Cement Work is generally conceded to be the best base coating for Keene's or white cements.

Keene's, Parian, Martin's generally described as "white cements," were originally patented. The base of all is gypsum mixed with alum or borax and recalcined and ground. English Keene's cement is generally made in three grades—coarse, fine and superfine—the first of a pink shade and the latter pure white.

For Base Coats Portland cement work is generally used, but many manufacturers advocate the use of coarse Keene's and sand. This method requires that the heads of all lath nails and exposed metal work be well shellacked to avoid rust. For first coat use 2 coarse Keene's, 3 sand. For second coat use 1 of coarse Keene's, 1 sand. Finish with neat cement.

Patent or Hard Plasters are numerous. The base of nearly all is calcined plaster mixed with sand, cement, hair or fiber, and treated with a chemical retarder which delays setting and allows time for use. They are generally good, being machine made of accurate proportions and furnished at building ready for use with the addition of water only. To save cost of transportation, some are delivered ready to use by mixing with sand and water. Owing to the increased cost of this material, thinner grounds are used.

Patent or Hard Plasters make only the base or rough coats. Good stucco or float finish work may be done with them, but all depend upon lime putty or white rock finish for a troweled coat.

Description of Work Done in Plastering.

Rendering is a good coat of hair mortar on brick or stone walls before lathing.

Back Plastering is lathing and plastering with one good coat of hair mortar on any frame work which may be required before regular lathing is done. Back plastering, when done between timbers, is a slow and expensive process. It is better to lath and plaster the timbers and restrap lath and plaster, as this method gives complete separation of wood work.

Deafening is a body of plastic material laid on boards fixed between joists of a floor, composed of lime screenings and cinder or ashes, or lime and mill shavings, about 2 inches thick. The use of cement in deafening is a detriment, as when made hard the deafening properties are destroyed.

Wood Lathing should have joints broken every twelfth lath nailed ⅜ inches apart for ceiling work and ¼ inch apart for wall work. Ends butted, no vertical lath allowed.

Metal Lath should have bearing, not exceeding 12 inches centers nailed on with flat headed nails for either metallic lath or expanded metal, and if finishing coat is required must be specified "three-coat work," as all metal lath must receive a scratch coat foundation for straightening. Arches, grains or furring for heavy moldings are best executed with metal lath.

One Coat Work is one good coat of hair, mortar or other plaster about ¼ inch thick and floated to an even surface.

Two Coat Work is one good coat of hair mortar straightened with a tool called a "darby" and floated. After this coat is dry apply putty coat of white lime and plaster with sand, if desired. The work cannot be made more than reasonably straight.

Three Coat Work is one good coat of hair mortar well scratched. Second coat of straightening mortar laid plumb and true. After this coat is dry apply coat of white lime and plaster with a mixture of sand, if desired, and extra well troweled or polished.

Roughcasting is a good coat of hair mortar left from the "darby," and when dry slapdashed with a mixture of lime and clean, fine gravel.

Stucco—this term is used to describe plastering work finished with a wooden tool or float leaving a rough granular finish.

Rough or Two Coat Stucco Work consists of one coat of hair mortar well scratched and finished with coarse stucco applied when under coat is dry, straight-

ened with a "darby" and brought to a rough, uniform surface. This work cannot be expected to be more than reasonably straight.

Three Coat Stucco or float finish consists of one coat of hair mortar well scratched with a second coat of straightening mortar laid plumb and true and finished with a coat of fine stucco properly floated to uniform granular surface.

Bastard Stucco consists of work executed as described for three coat work with the exception of the last coat being composed of 2 parts lime putty to 3 of sand laid true and floated to an even surface; this is then troweled to a hard surface but the face is not made perfectly smooth.

Troweled Stucco is same in material and method as bastard stucco, the difference being that it is troweled until face is brought to a true smooth surface. In both bastard and troweled stucco the under coats must be thoroughly dry; there being no plaster or cement used in this work, the success depends upon proper and uniform suction.

Dubbing Out is the term given for the necessary work in preparing the uneven surface of rough brick work for fire proofing to allow of plastering. If done with mortar it will require that not more than ½ inch be put on at one time and may take several coatings to bring the work to the proper surface. By using gauged mortar or hard plaster the necessary thickness may be applied at one operation.

Portland Cement work requires same methods for stucco work as already described for mortar, the proportion of materials being as described in materials near the beginning of this article.

Troweled Portland Cement requires under coats, as described above, and is finished with 2 of Portland, 1 of fine, sharp sand, to which is added one-twelfth of fine lime putty, laid even and troweled to a fine polished surface.

Plaster Moldings are formed with gauged mortar and finished with gauged putty. When weight of molding is not too great the mortar may be dispensed with. Owing to the danger from settlements and shrinkages the thickness of these moldings should not exceed 1½ inches in any place. All heavier work requires to be bracketed.

Plaster Castings are composed of plaster and cast from molds required by the design or article to be duplicated.

Staff Castings are composed principally of plaster to which fiber or canvas has been added before the plaster has set. The cost is no greater than for the plaster castings, and they are much stronger, allowing of very large work to be made in one piece. These casts may be sawn and fixed by nailing.

Staff calls for special attention. There is no limit to its possibilities as a decorative material either in conjunction with run moldings for enriched members or for the production of moldings with enriched members and decorative features complete. By its use the entire decoration may be prepared while the building is in course of erection, ready to fix as soon as work is ready to receive it, in this way saving much valuable time. The manufacturers carry full stock of such ornaments as are in general demand, but work to detail requires special models, for which due time should be allowed. Specifications should state whether work is to be from stock or specially modeled to detail.

Wood Fiber Plaster or other hard plaster may be specified for any work where mortar is used for interior, as described in previous clauses. A great saving in time can be effected by its use, particularly in winter or damp weather.

Tools and Terms.

Scratching is the term used to describe the cross scoring of the first coat of mortar to form key for straightening coat or coarse stucco finish.

The Darby is a wooden tool about 3 feet long, 4 inches wide and ½ inch thick, with two handles by means of which the first coat is two coat work, and stucco coat in two coat stucco is leveled or roughly straightened.

The Float is a wooden tool about 14 inches long, 4 inches wide and ⅝ inch thick, used after the "darby" and straightening rod to level out the work, also for finishing stucco work.

Grounds for plastering work should be of soft pine firmly nailed and made true and straight. The thickness of grounds determines the widths of frames and jambs and should be considered together. For brick work or terra cotta the thickness here given is supposed to be fixed close to wall; if unduly packed out to straighten defective walls a dubbing out coat is necessary.

Two-coat work in lime mortar on lath, ¾ inch grounds.
Two-coat work in lime mortar on brick, ⅝ inch grounds.
Three-coat work in lime mortar on lath, ⅞ inch grounds.
Three-coat work in lime mortar on brick, ⅝ inch grounds.
Grounds for metal lathing, ¾ inch.
Two-coat work hard plaster on lath, ⅝ inch grounds.
Two-coat work hard plaster on brick, ⅝ inch grounds.

Gothic Geometrical Planning.

Many architects scout the idea of proportion in Gothic buildings altogether. They say that it is useless to design the building on paper according to strict geometrical rules, as the foreshortening in perspective and the differences of planes will destroy the proportions in execution; but, on the contrary, we know that Greek and Roman buildings are equally satisfactory in drawing and in execution, says a writer in the *Architect and Contract Reporter*. There is no good architecture without good proportion, for without proper proportion architecture is merely indifferent building. All the best buildings of the best Gothic period, such as Ste. Chapelle, Amiens, and the cathedral of Lausanne, were designed on certain principles of proportion, and this can be proved by measurement. This fact has attracted the attention of many eminent architects and writers on architecture. The first to call attention to it was Cæsar Cesariano, the translator of "Vitruvius," who proved clearly that Milan Cathedral was designed on the lines of a combination of squares and triangles. This idea was developed by Kerrich in a paper in the nineteenth volume of "Archæologia," who applied the form of the *vesica piscis* to many ancient examples with great success; to the plans of Bath Abbey Church, Croyland, Lincoln, Hereford, and other cathedrals and churches. Hawkins, in his book on "Gothic Architecture," published in 1813, recapitulated the evidence in favor of the system of proportion. Professor Cockerell, in a paper read at a Winchester meeting of the Archæological Institute, showed that the *vesica* gave William of Wykeham the guiding lines for the plans of his chapels, but he found that the equilateral triangle did not apply to the sections of all the chapels. In the Lincoln volume of the same institute there is a paper by Mr. Penrose on the "Proportions of Lincoln Cathedral," which he proves to have been originally designed on the system of squares called pariquadrats.

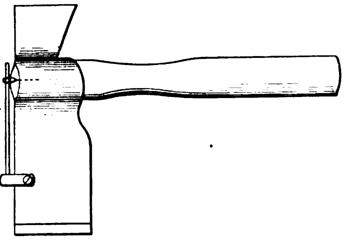
But Viollet-le-Duc in his essay shows conclusively that triangles of various forms characterize generally the buildings of successive periods. In the round arched styles the rectangle was used; in Early Pointed, what he terms the Egyptian one, in which a perpendicular line drawn from the apex equals two and one-half to four parts of the base; in later periods the equilateral triangle, together with the Egyptian.

In the church of St. Sernin, at Toulouse—a noble Romanesque edifice with double aisles, the interior of which strikes every one who enters it on account of its fine proportions—he found that on dividing the ground line into 20 parts 5 of them gave the half width of the nave, 2 the thickness of the pier, 4 the width of the inner aisle, 2 the thickness of the second pier, 4 the width of the outer aisle, 2 the thickness of the wall and 1 the projection of the buttress. An Egyptian triangle springing from the outer base line gives the springing of the vault of the nave and the abacus of the arches of the aisle, and an equilateral triangle opening from the center of piers of the arch meets this in the center of the arch and gives the hight of the nave arches. In the Ste Chapelle he shows that two equilaterals give the slope of the arch over the windows; that another, based on the window sill, gives the springing of the groining, and that others govern the entire composition internally and externally.

CORRESPONDENCE.

Appliances for Rapid Shingling.

From Frank G. Odell, *Lincoln, Neb.*—I have been much interested in the appliances for rapid shingling illustrated in your February issue, inasmuch as some of them are familiar to me from frequent use. I had occasion the present week (February 17) to make a practical test of some of them on a little job of roofing—6500 shingles to lay on a roof of 9 and 12 pitch, and a storm coming up. Delay with the tin work kept us off the roof until 3.15 p. m. Five men with "three-cornered stools" and one apprentice boy to open and scatter shingles, put on the 6500 in 2 hours and 30 minutes, sawed off the ridges and cleaned off the scraps from the roof. The standing gutter on the roof was used for the first foothold, and no other scaffolding was used. This is not unusually rapid shingling, as there were no real "fast" men on the job, but on a fair division it averages about 15 hours' work or 433 1-3 shingles per hour (I'm a believer in fractional calculations myself), or about 3500 for an eight-hour day. When it is understood that because the tinners were in the way all the six men were bunched on one side of a 20-foot roof practically all the time it will appear fairly respectable shingling after all. Three of the five shinglers could not lay more than one bundle an hour if their lives depended on it. This left the other two men hitting close to a 7000 clip to catch up the 1750 shingles necessary to keep the pace of 2600 per hour.



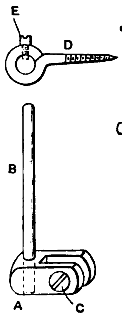


Fig. 2.—Details of the Gauge.

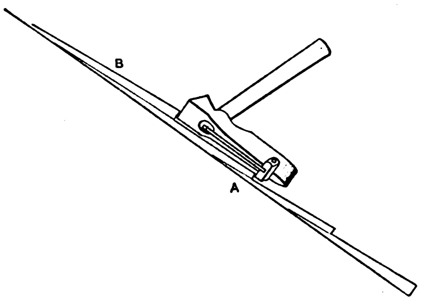


Fig. 3.—Manner of Using the Gauge.

Appliances for Rapid Shingling.—Contributed by Frank G. Odell.

These were "five to two" cedar shingles, laid 4½ inches to the weather, no shingles over 8 inches wide and each one nailed with two 3d galvanized nails. The job is at 1749 North Twenty-sixth street, Lincoln, Neb., and if any doubting Thomas insists on further proof of the facts it can be easily furnished. I may add that only one man on this roof had a hatchet gauge, the remainder shingling to line, which is not conducive to speed.

I hand you herewith sketches illustrating the gauge used, which is of my own devising and manufacture, and which I have been vain enough to dub "The Perfect Shingling Gauge." This device is the culmination of years of experimenting to meet the objections to other types. I have used the gauge illustrated by "Western Builder," but it is easily jarred loose from position owing to the spring of the wire and the lightness of the lug on the end. This is very likely to happen in trimming a shingle, and I have had to repair this gauge frequently because of this weakness. The drilling of holes in the hatchet blade for a pin is a hard job and weakens the blade considerably. The filing of gauge marks on the hatchet (a common expedient) is a makeshift only. The requirements call for a gauge easily adjusted, positively locked in position, of substantial character and not too heavy. I believe all of these requirements are met in "The Perfect" gauge.

Referring to the illustrations, Fig. 1 shows the gauge fixed to the hatchet. Fig. 2 shows the gauge in detail, A being a slotted metal head carrying the gauge rod B, which is tapered into the head and securely riveted. This rod passes through a heavy screw eye D, which screws into the handle of the hatchet. The gauge is secured to the hatchet by a heavy set screw C and a small set screw E in the screw eye D. The projecting shoulders of the head A form a convenient and accurate stop, which may be quickly set at any given distance from the head of the hatchet, thus governing the width of course. The whole fixture can be removed from the hatchet easily and occupies practically no chest room. Fig. 3 shows the manner of using the gauge A, being the last course of shingles laid, the new course B resting against the head of the hatchet, which automatically measures the distance.

The writer has been encouraged to market this device, and arrangements are now under way to manufacture it in quantities. When such arrangements are complete it will be noted in the advertising columns of *Carpentry and Building*. Meanwhile, if any of the craft care to go to the trouble of making one of these gauges for individual use, permission is most cheerfully given and no request at this office will be necessary.

Making Concrete Posts.

From H. G. T., *Hamilton, Ont.*—Will some of the readers of the paper kindly explain the makeup of a concrete post and what is the best size for it? How should the wire be fastened thereon? What is the best kind of molds in which to make the posts? I hope there are a number of readers sufficiently interested in concrete to take up this subject and discuss it for the general good.

Meaning of the Term "Newel."

From Hee H. See, *Brockville, Can.*—I notice in the December issue of the paper that a reader inquired why "newel" is so called. I would suggest that it originally meant the post in the center of winding stairs—probably stone stairs—and that it is derived from "Noyan, stone of fruit," because it lies in the center.

Average Day's Work for a Carpenter.

From E. B. C., *Milwaukee, Wis.*—So much has been said about the amount of work the average carpenter ought to do in these progressive days that I am tempted to mention some of the results of my own experience. I have worked with men who day after day have accomplished the following work in eight hours:

One man can cut and lay 500 feet of sheathing boards;

Can cut and lay 250 feet of 4-inch siding and 350 feet of 6-inch siding;

Can cut and lay 800 feet of 6-inch flooring;

Three men can cut and nail 3500 feet of different widths of roof boards;

One man can cut and lay 2000 shingles;

Can place in position 750 feet of joists;

Can place in position 500 feet of studding;

Can cut and nail 275 feet of 2-inch flooring and 400 feet of 4-inch.

Of course it must be understood that a carpenter will turn out far more work if he is left alone than if the boss stands around and keeps howling at him all day long. If a carpenter will neglect his work when the boss turns his back and will try to kill all the time he can when the boss is not around he should be discharged at once and a better man put in his place. I do not believe in standing behind the carpenter and driving him to work, but my men must turn out the work, as I have no room for the man who does not come up to his standard. In the next place I believe in paying the carpenter from 30 to 45 cents per hour, according to his ability. A carpenter who is well paid and receives humane treatment from his boss will always strive to turn out the most and best work without being watched. I have made a personal study of these phases of human nature and what I have to say is based on practical experience.

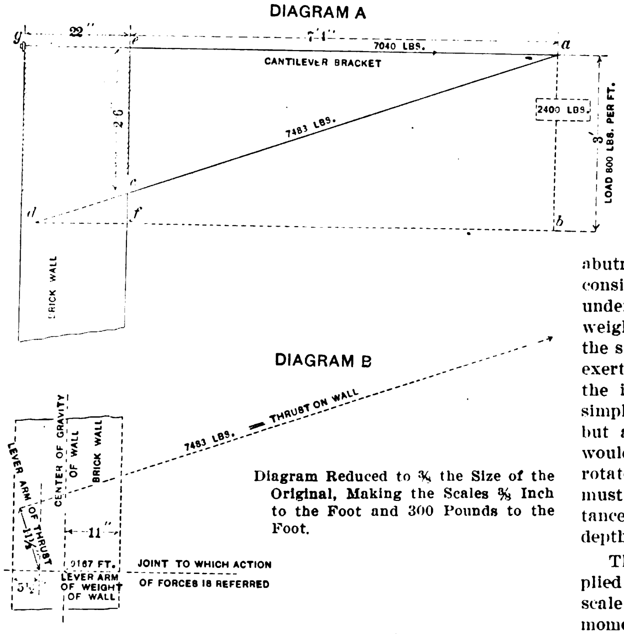


Diagram Reduced to ⅜ the Size of the Original, Making the Scales ⅜ Inch to the Foot and 300 Pounds to the Foot.

Resistance of Brick Wall to "Pull" of Fire Escape Bracket.

Resistance of Brick Wall to "Pull" of Fire Escape Bracket.

From C. H. T., *Ohio.*—I have at present under consideration a case where brackets are designed to project from the side of a theatre wall to carry a fire escape balcony, which extends 7 feet 4 inches from a 22-inch wall, the brackets being about 2 feet 6 inches deep. They are to be constructed of iron, with the top member running through the wall. I want the brackets to carry about 2400 pounds each.

As this bracket cannot be fastened to any floor it exerts a "pull" and a "thrust" on the brick work, and I am desirous of estimating in some definite way what strain a brick wall is capable of resisting from a bracket of this kind.

Answer.—This bracket is what is called an open cantilever beam, or a braced cantilever girder. The first step is to ascertain the pull on the horizontal or top member. We know that the horizontal strain at any point in a horizontal flange of an open cantilever is equal to the load multiplied by its leverage at that point divided by the depth of the beam.

Referring to the accompanying diagram and data, it is seen that the load is 2400 pounds, the leverage is 7 feet 4 inches, and the depth of the cantilever beam is 2 feet 6 inches, hence;

$$\frac{2400 \times 7 \text{ feet 4 inches}}{2 \text{ feet 6 inches}} = 7040 \text{ pounds.}$$

or the pull which the load of 2400 pounds exerts upon the wall. The thrust of the inclined member of the cantilever can be determined in the same way as the strain on the jib of a crane, or it can be done graphically.

In the diagram A, originally drawn to a scale of 1 inch equals 1 foot, lay off on the load line *a b* to a scale of 800 pounds per foot the load of 2400 pounds; draw *a c* parallel to or coinciding with *a c*, and prolong *a c* indefinitely. From *b* draw *b f* parallel to *a e*, and *a c* and *b f* will intersect at *d*, thus closing the polygon of forces. If accurately done *d g* should equal *a b*. By the same scale measure *a d*, which will be found to be 7483 pounds, or the thrust against the wall acting along the inclined member.

Now the forces tending to rupture the wall, or to produce rotation, are the forces exerted by the pull and thrust acting together, but they are acting on what must be considered as a rigid frame. The pull on the tension member by reason of this rigidity is resolved into a thrust along the inclined member. This latter force becomes the resultant of the upward reaction of the wall and the tension in the upper member, so that the real force tending to produce rotation is concentrated in the thrust upon the wall.

Now it would be possible to determine where this force would pass outside of the opposite face of the wall and thus show the necessity of increasing the thickness of the wall in the form of an abutment, but this method we have not been asked to consider. To obtain merely the equilibrium of this wall under the imposed load we must make the moment of the weight of the wall above the horizontal joint at which the strain is taken just equal to the moment of the thrust exerted by the pressure of 7483 pounds along the axis of the inclined member. In such a calculation we would simply have the two opposing forces balancing each other, but any additional strain or inequality in construction would either crush the outer edge or cause the wall to rotate about the edge. To be safe, the axis of rotation must be referred to an axis within the wall, and its distance from the outer edge should be about one-fourth the depth of the wall, or in this case 5½ inches.

The moment of the thrust is the force itself multiplied by its lever arm, and measuring this off by the same scale as the force is drawn, or 1 foot 1½ inches, the moment of the force is equivalent to the expression: 7483 × 1 foot 1½ inches, and the moment of the wall is equal to its weight above the joint in question, acting through the center of gravity of the wall, which in this case lies in a plane passed through the center of the depth of the wall and in a vertical direction, multiplied by its lever arm. The lever arm will be one-half the depth of the wall, or 0.9167 feet. Putting these two opposed forces equal, the equation for stability becomes: $7483 \times 1.125 = W \times 0.9167$, in which W, the unknown quantity, is the weight of the wall above the joint in question necessary to resist rotation. Upon solving the equation W is found to be 9183 pounds. A wall 1 foot long and 22 inches deep at 115 pounds per cubic foot will weigh 210.45 pounds, hence the hight of the wall necessary to produce stability would be $\frac{9183}{210.45} = 43.5$ feet.

This result shows that a 22-inch wall of brick of ordinary hight would not have sufficient weight to withstand such a strain. To build a wall 43½ feet higher than the point of application of the strain would as a general thing be an impracticable solution of the problem.

If such a load must be borne on a bracket of such length and depth, the safest way would be to prolong the vertical arm of the bracket downward and make it stiff enough to bear without flexure the thrust of the inclined member. The other alternative is to deepen the wall in the form of an abutment wherever the brackets come and determine that depth in the usual way for finding the stability of a buttressed wall which has to support the thrust of an external load. C. POWELL KARR.

Shingling Valleys Without Flashing.

From P. C. D., *Fryeburg, Maine.*—I notice in the last number of the paper that "T. B.," Toronto, Can., asked for a method of shingling valleys without flashings, and as being of possible interest to this and other correspondents I will state the way I do it. Take a 3-inch board and bevel both edges to fit the valley. Lay the first course to the edge of the 3-inch board in the valley. Cut the side valley shingle the same shape as for an open valley. It will be necessary to pare off the top of the first side valley shingles, as at A. Lay the valley shingle B on these and then lay the double course with the edge beveled so it will lap on the valley shingle about an inch. The shingles will spring somewhat, but the nails will draw them down to make a tight job. The rest of the side valley shingles do not have to be beveled to a thin edge. Next lay off the lines for the second course and where they meet the line of the 3-inch board will be the points for the corners of the 3-inch square valley shingle, C. Now at half the distance from the bottom of the first shingle in the valley to the line for the 3-inch shingle lay a 5-inch shingle D, beveled to 3 inches on the bottom. Lay the shingle D first, then lay the 3-inch one, C, in its place. From this it will be seen that two courses are laid in the valley to every one of the straight courses, and that only one shingle, B, is laid to start the valley. In doing the work I pick out as many 3 and 5 inch shingles as there are courses to be laid and bevel the 5-inch ones so that they are 3 inches on the bottom.

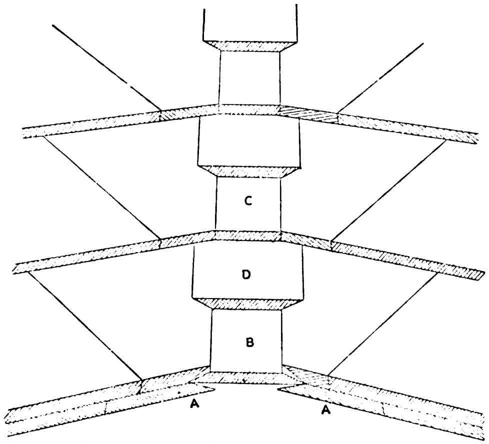


Fig. 1.—Method Suggested by "P. C. D."

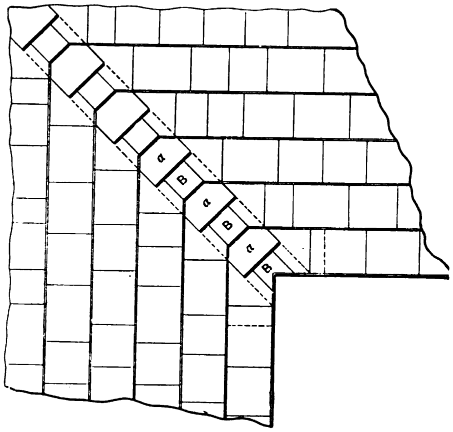


Fig. 2.—Plan Described by "A. C. S."

Shingling Valleys Without Flashing.

This is a method I learned from an old man when I was a boy. It has almost been lost to the trade, but I believe it to be the best valley that ever was put in for a shingle roof.

I want to say that I think "O. M. T.," Ocean City, has made a good suggestion in asking to have answers to questions censored, for there are a lot of us who do not know any too much and are likely to get into trouble in following wrong advice.

From A. C. S., *Winchester, Ohio.*—I noticed in the March issue of *Carpentry and Building* an inquiry from "T. B.," Toronto, Can., asking for a method of shingling valleys without the use of metal, and in reply thereto I enclose a sketch showing how the work is done. First take a strip of wood about 4 inches wide and chamfer the under edges on the outside so that it will lay down smooth to the sheathing, and nail it in the valley. Take a shingle about 5 inches wide to start with and lay lengthwise of the valley, fitting the shingle on each side. The first course, which is always double, will then start with the narrow shingle marked B and be carried up the valley, as shown in the accompanying sketch. Half way between each course lay a shingle *a* about 4 inches or 5 inches wide, as the case may require, chamfering underneath on each side so that the next course will smooth over it. Continue in this manner to the top of the valley. Starting from the valley the first shingle of each course out on the roof is cut with the valley line so as to overlap the immediate shingle up the valley marked *a*, and to fit snug against the narrow ones marked B, as indicated by the full lines in the sketch. The dotted lines represent the continuation of the shingle marked *a* under the roof.

I will say in conclusion that in this section of the country we always use a strip of metal from 14 inches to 16 inches wide, bent in the center to the angle of the roof, with the outer edges slightly turned up or over, rather, say about ½ inch, to prevent the water from dashing over. After the tin is in place on the roof we strike a line on either side from 2 inches to 3 inches from the center of the valley at the bottom and from 1 inch to 3 inches from the center at the top, then shingling to these lines, leaving an open passage for the water. The valley being a weak spot on the roof cannot receive too much attention.

Use of Metal Lath in Dwelling House Construction.

From H. E. T., *Willoughby, Ohio.*—I wish to inquire through the medium of your valuable magazine, of which I am a reader, as to the merits of steel lathing. Is it satisfactory for dwelling house purposes? Has it any virtue in deadening sound? We are using wood pulp plaster in this locality, and a house plastered with it on wood lath is practically one room so far as sound is concerned. I wish to hear from some one who has had practical experience with metal lath.

Note.—The extent to which metal lath is being used at the present day in connection with building construction should provoke a number of replies to the questions raised by the correspondent above, and we trust no one will hesitate to express his views.

The Eight Hour Day System.

From E. B. Clark, *Milwaukee, Wis.*—Will the editor kindly make a little room in the columns of *Carpentry and Building* and publish the following views on the eight-hour day system? I personally am in favor of an eight-hour day throughout the country for carpenters, as I believe a carpenter can accomplish about as much in eight hours of conscientious and persistent effort as he can in nine or ten hours under present conditions. I believe that useful ends of this kind should be attained by peaceful methods. The shortening of the hours of carpenters is a vital element in their own personal welfare and in the progress of society. It means better work, better pay, more opportunity for self development and a higher citizenship. The rule of money must give way to the rule of manhood. Reasonable leisure is a fundamental condition of intellectual development. A carpenter is a skilled mechanic and not a mere machine. He is a trained man and if he does the best possible work he must love his profession.

I am in favor of the eight-hour day because I thoroughly believe as a general proposition that eight hours are enough for work in any one day and it is but proper that the carpenter should have sufficient leisure to improve his mental and physical condition, thereby evolving a better type of American manhood. A man may well work more than eight hours if he likes at any vocation selected by him for his own sake or for some other reason than economic pressure and under conditions which make it possible for him to stop when he chooses and work in the way he wishes. But for a carpenter under the beck and call of a boss or working simply to secure the means of livelihood eight hours is enough.

Criticism of First Prize Design in $6500 House Competition.

From C. A. WAGNER, *Port Jervis, N. Y.*—I notice in the April issue the design awarded the first prize in the competition in $6500 houses, and with the editor's permission I will offer a few comments in the way of criticism, as it may be the means of drawing out an expression of opinion from others. In the first place, I do not consider it a good feature to have the workboard or table in such a place that a person is obliged to stand with back to the light. This I consider a very bad point. I could very easily improve the first prize plan as regards the pantry layout, and would by all means have the worktable at the window or light; also would have connecting doors to the china closet and do away with the coat closet in the dining room, placing it in the reception hall. I would arrange the flues to have a grate in the fireplace. There are several other points in connection with the first floor, but I do not want to suggest all of them, as I would like to have our brother readers tell what they think. In regard to the second floor plan, I would arrange to have access to the sewing room direct from the hall, provide a broom closet, &c.

Now as to materials and the amount required, I would say that I have only taken a few, but would ask some of the readers to go over the plans and specifications and tell me what they think. For a starter, I would ask what are the sills to be, and are they in the estimate? Porch floor 1½ inches thick and laid in lead; list calls for $17.20 for material, $3.50 for work. I figure 449 square feet of flooring at $70 equals $31.43, and the work cannot be done, laid in lead in workmanlike manner, for less than $12. The nails and white lead are gratis. This makes a small difference of $22.73 shortage on this item. The same will hold on different items. Mr. Lindl calls for 2000 shingles; I say 14,000 at $4.50, which equals $63, instead of $20, and $35 at the least for work in place of $8—a shortage of $70, a very small item, as the nails are gratis, say 75 pounds of 4d.

I could if I had the time tear up this estimate, but will only mention that we could not in this locality build the dwelling for the amount or anywhere near $6500. The item "nails, including sliding door hangers," would seem nearer the mark if it read $55.

I hope to see my comments in print and that they will create an opening for other readers who have more time to give us an itemized bill and *real* cost, as the difference in prices is about the same all over the country, and the cost of materials the same as to finished lumber. I would also refer to the details, which are not numerous, but only a selected few. Are the balusters to be square or on what order? In my estimation the first prize design has a poor lot of details for such a costly house.

Mr. Lindl's Reply.

The above comments were submitted to Mr. Lindl, author of the design awarded the first prize in the Thirty-ninth Competition, who furnishes the following reply:

MILWAUKEE, April 7, 1906.

Referring to the criticism of my design in the April issue, I would say regarding the workboard in the pantry that I agree with Mr. Wagner in thinking it would be more desirable to have it near the window. This, however, would necessitate moving the doors toward the center of the building, thereby cutting up the space occupied by the sink and the space for china closet, which under my arrangement occupies the center of the dining room wall, presenting a much better appearance than when out of center.

Regarding the coat closet, it was found impractical to have it open toward the reception hall, as that particular wall space is occupied by the mantel, which is treated as a feature. Since it is a gas burning mantel, the vent pipe marked on the original plan, though not shown on the reproduction, is all that is required to take odors away. In place of a direct entrance to the sewing room, as suggested in the criticism, I considered it more practical to utilize this space for closet room. The sills are included under the item on brick, though not separately mentioned.

While $70 per 1000 may be the correct price for porch flooring at Port Jervis, it does not coincide with the Milwaukee price, which was quoted to me for a little more than one-half the price above given, and I venture to say that a man charging $12 to lay 450 feet of flooring would find it a difficult task to obtain employment at that rate in this city. The white lead is furnished by the painter, and the nails are included in the item for nails, &c. This makes the supposed shortage dwindle to nothing.

Mr. Wagner says I call for 2000 shingles. This is not true. I refer all readers to the item in question, which reads thus: "Shingles $20," not "2000 shingles."

In conclusion, he says he could "tear up this estimate if he had time." It is not clear whether he means the one contained in his criticism or the one appearing in the April issue of *Carpentry and Building*. At any rate, comment on this part of his criticism is unnecessary, since it plainly shows the spirit in which it was written.

A word regarding the reliability of the estimates. The gentlemen submitting them have, in accordance with the conditions of the contest, signed certificates binding them to do the work strictly according to plans and specifications for the figures submitted, in Milwaukee, if called upon to do so. Furthermore, they have, one and all, carried out important contracts under the supervision of the firm with which I am identified, and know what they are about. I say that the building illustrated in the April issue can be built for considerably less than $6387 by substituting less expensive plumbing fixtures, finish, painting, glass, &c.

In conclusion, I again refer Mr. Wagner to the conditions of the contest, which do not call for numerous details, but for a good selection of exterior and interior details, embracing both finish and construction. I have endeavored to comply with this requirement, and if the details do not seem clear enough on the reproduction it is due to the fact that they had to be reduced in order to be published in the columns of *Carpentry and Building*. The balusters are marked turned on front elevation of original drawing, though not so shown on reproduction.

My critic is certainly entitled to his own view with regard to the quality of the details, but the gentlemen comprising the jury on awards seem to have been satisfied with them, since no comment is offered thereon.

Encouragement to Young Builders.

From A. E. C., *Vancouver, B. C.*—Under the above heading there appeared in a recent issue a few remarks from "Western Builder" expressive of his opinion of what he terms "simple life in carpentry cut short," and I must agree with him that he has cut it decidedly short when he tells of the feats accomplished in laying shingles. I quite agree with him, however, that the three-cornered stool and the hatchet with a pin in it constitute the best kit to lay shingles speedily, for with practice a man can lay 5000 and 6000 a day on a straight roof and lay them properly, but it all takes practice. The average carpenter, however, will not lay over 3000 on the average roof in eight hours.

The statements of "Western Builder" suggest some interesting calculations. If he lays 3500 in three hours, putting two nails in each shingle split and each shingle split 4 inches, he will require 7000 nails. In three hours there are 10,800 seconds, so that he will have to lay a shingle and drive two nails every one and one-half seconds. Besides this lightning movement he must put the shingles on the roof, keep his mouth filled with nails, move his three-

cornered stool along the roof, and place his shingles in position. In my opinion I regard this as an utter impossibility. I have been in the building business for over 15 years, and have handled men of all calibre and under all conditions, therefore I am judging from practical experience. No doubt the average carpenter does make a good many short cuts in carpentry, but a serious cut for the contractor. I think "Western Builder's" second proposition in regard to one man shingling his side of the roof faster than seven men on the other side is a little bit overdrawn. "Western Builder" does not say how long it took the seven men to lay the 14,000 shingles, but we will assume that each man laid 2000 in eight hours, which is a low estimate on a straight roof 80 feet long, therefore it would take the seven men eight hours to lay 14,000 shingles. If the lone man on the other side beat the seven men to the top by four courses he would have laid his 14,000 in seven and one-half hours, These 14,000 shingles require two nails to the shingle, or 28,000 nails, and as there are 27,000 seconds in seven and one-half hours the man would be obliged to drive a nail in less than a second, to say nothing about laying the shingles, and the movements, such as placing them, getting nails, &c. Instead of telling these feats of rapid shingling I think it much better to tell how various kinds of work can be done to advantage and about how much of it the average carpenter can do without being an expert. It seems to me the shingling question has been pretty well exhausted, and I would like to have some of the readers in the States describe how they hang windows, put in the frames, set sliding doors, put on the trim of a room or some other work which is likely to be of practical value to those who are desirous of learning the business.

House Plans Wanted.

From Cyburo.—Will some of my brother readers of *Carpentry and Building* furnish for publication the plan of a house 44 feet front and 20 feet deep, with an extension in the rear for a kitchen, etc.? There should be four rooms on the first floor and an entrance door at either end or in the center. The second floor should have four bed rooms, with two bed rooms, bath and dressing rooms over the extension. I would also like to have bed rooms in the attic. The house to be of brick, with a flat roof.

Roof Plans for "A. S. W.'s" House.

From F. C. B., *St. Thomas, Ont.*—Inclosed find a roof plan, Fig. 1, in answer to the request of "A. S. W.," Belmont, W. Va., in a recent issue of the paper, and which I hope will suit his requirements. I have drawn it as representing a half pitch roof, because I think the gable would be too low with a roof of less pitch. In constructing the roof I would allow all four hips to run full length to the plate and allow valleys to intersect with them at the ridge lines of the gables.

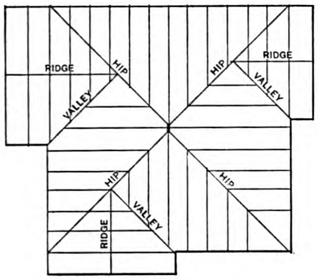


Fig. 1.

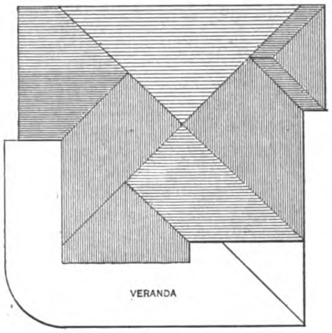


Fig. 2.

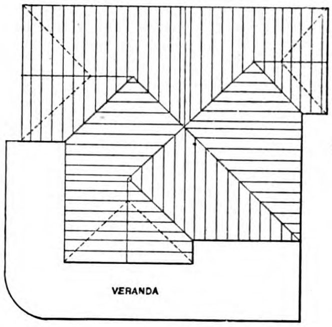


Fig. 3.

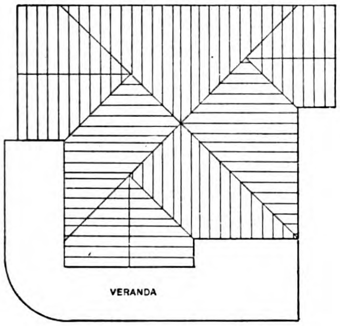


Fig. 4.

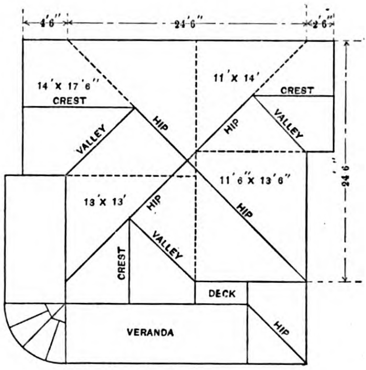


Fig. 5.

Roof Plans for "A. S. W.'s" House.—Submitted by Various Correspondents.

From G. S., *Niagara Falls, N. Y.*—I am sending a tracing, Fig. 2, representing a plan of roof as requested by "A. S. W." in a recent issue. The drawing gives him an idea of how the roof might be built.

From J. W. S. E., *Chicago, Ill.*—The plan, Fig. 3, which I am sending, is intended to meet the requirements of "A. S. W.," who asked in a recent number of the paper for something of the sort. The dotted lines indicate hips, in case he prefers the roof framed that way, instead of gables. The plan is for one-half pitch.

From A. G. R., *Holderness, N. H.*—The plan shown in Fig. 4 is submitted in reply to the request of "A. S. W.," Belmont, W. Va., in the March issue of the paper.

From W. L. R., *Mt. Carmel, Ill.*—I am sending a sketch, Fig. 5, of roof outlines in answer to the query of "A. S. W.," who will notice that the plan of the roof is square, 24 feet 6 inches each side. To frame this roof I would cut the four hip rafters full length, as indicated

by the dotted lines, and cut the common rafters where they cross. The correspondent does not say whether the veranda is to be open balcony roof or shingles, but I have inferred the latter.

Note.—We also have from "F. A. S.," Dana, Ind., a solution of the problem similar to that shown in Fig. 2 of the method furnished by "K. L." in the April issue, with the suggestion that "A. S. W." can frame the roof with a deck, as indicated in Fig. 1 of the solution in question.

Relative Cost of Frame and Concrete Buildings.

From L. B., *New Rochelle, N. Y.*—In view of the interest which is developing all over the country in concrete construction, will some of the readers who have had experience tell me the difference in cost between a flat building, 30 x 50 feet, constructed by the Hollow Ransome Twisted Iron System and one of regular frame construction of the same size and built in the best manner? In the case of the concrete building the outer wall is to be 4 inches thick, then a 3 or 4 inch space, and then a 2-inch inner wall, with vertical lugs every 4 feet to connect the two walls. The inside partition is to be 2 inches thick, also using the twisted iron system, and the floor is to be 4 inches thick, of the same system. What I want to know is the difference in cost between two structures of this kind, exclusive of the interior trim. What is the difference in cost between a Ransome floor 4 inches thick and a "Metropolitan" floor the same thickness?

Value of the Correspondence Department.

From. HEE H. SEE, *Brockville, Ont.*—I notice in the March issue that "O. M. T." Ocean City, N. J., is of the opinion that the answers to correspondents should be censored in some manner. Well, Mr. Editor, I cannot agree with him. I keep a pretty close watch on this part of the paper and think there are very few mistakes which will pass the eagle eyes of the censors that we already have. I think if we could have a censor of censors it would do a great deal more good. It may be taken for granted that when a man takes the time and trouble, to say nothing of the 2-cent stamp, to answer an inquiry he is doing it with the hope or idea of helping some one, and I do not think it is very nice for some other fellow—who until then has let the original inquiry go unheeded—to get up and walk all over him. I think myself that a few lessons from the Earl of Chesterfield would do most of us a lot of good. Criticism and correction are sometimes necessary, and when they are we ought to handle the subject as carefully as possible so as to raise no hard feelings, for it does not pay to make any man our enemy. In this connection I hasten to assure "O. M. T." that this letter is not aimed in his direction. His communication merely gave me the opportunity to air my views.

Letters of censure are not so liable to hurt the feelings of the regular correspondent as they are those of the beginner, and the newcomer who might perhaps have blossomed into an interesting writer will just as likely be frightened away altogether by too severe a criticism of his first article. So I would ask our vast army of censors to form two resolutions when writing letters of criticism. First, deal as lightly as possible with the offender; second, be sure you have some better way of your own to offer and then offer it. Unless you are able to do this last do not criticise at all.

If after you follow these rules the other fellow gets rusty and comes back at you with a lot of east wind, you have my permission to "jump on him" just as hard as the editor will allow you.

I have lately been turning over the pages of some back numbers of the paper and it has been impressed upon my mind more than ever that the correspondence columns are one of the most valuable features of the paper. This is because of the great number of little items and wrinkles that appear in them that one cannot find in the regular textbooks. That wonderful man Sherlock Holmes used to say, when speaking of crime, that "there was nothing new under the sun—that everything had been done before," and he had a large scrap book filled with cuttings relating to his business to which he used to turn for information. What a fine thing it would be for the carpenter if he could get a similar book of cuttings relative to his business. What a snap if every time he came to a knotty problem he could say: "Well, this thing has been done hundreds of times before. I will just look it up in the scrapbook." Fine, eh! But where is he going to get his cuttings to put in his scrapbook? Sherlock got his from the daily press, but the daily press does not publish many of the carpenters' problems, and whenever they do they get them mixed. No, sir. The only place of which I know where he can obtain these cuttings is in the correspondence columns of *Carpentry and Building.*

This being so, my brethren, it is up to all of us to send every wrinkle or short cut of which we know to the editor for publication. We often find out little things by accident that might take the other fellow quite awhile to figure out for himself, and again things that are quite well known in some parts of the country may be entirely new in others.

There is just one other thing I should like to mention before closing this letter and it is this: I think it would be a good idea for correspondents who receive answers to queries to acknowledge them. They might also state if they found the information of use or, if not, what they used in its place. How often we see correspondents arguing back and forth about something, while the inquirer is never heard of after the first letter—never takes the trouble to say which of them is right or which helped him the most!

Note.—The suggestions contained in the closing paragraphs of our correspondent's letter are most timely and we trust that those of our readers interested will regard them as worthy of more than passing attention.

Weather Boarding a Circular Tower.

From C. J. M., *St. Johns, New Foundland.*—With reference to the letter of "R. J. O'B." in the January issue of the paper, I would say that if he had a little knowledge of boat building, as nearly every man in this country has, he would experience no difficulty in finding the proper curve of the siding for his circular tower. Here is an easy method of doing the work, one which any practical carpenter will readily understand: First with a straight batten and pencil strike a level line around the tower at any convenient hight, after which take a piece of siding of average length, and inside the under or thick edge of it tack a narrow strip equal in thickness to the under lap of the siding. Tack this around the tower above the line, having its ends just touching the same, then take the distance between the line and the center of the piece of siding in the compasses, and at distances of about 6 inches apart, with one point of the compasses on the line, prick off points along the face of the piece of siding. Now with a thin batten sweep around these points and the correspondent will have the true curve of each piece of siding. To any man with a knowledge of geometrical drawing this sort of work comes quite easy, as it is nothing more than the development of a cone, as each course of siding on a circular tower is a horizontal section of a cone. If any reader of *Carpentry and Building* knows of an easier way to help the correspondent out of his difficulty I would be very glad to hear from him.

Some Questions in Hollow Block Construction Answered.

From L. W. B., *Rockville, Ind.*—In reply to "W. L. P.," Occidental, Cal., whose letter in reference to plastering on cement blocks appeared in the April issue of the paper, I would say that he can plaster directly on the blocks without lath. All that is necessary is a thin coat of brown mortar to straighten his walls and then his skim coat in the usual manner. His blocks should be faced with ½ inch of fine sand and cement mixed 1 to 3. This will tend to prevent the dampness from penetrating his blocks.

In regard to the steel I-beams, would say that two beams 4 x 12 inches and 40 pounds to the foot will be sufficient to carry the load in question if they are securely bolted together.

CABINET WORK FOR THE CARPENTER.

THE CONSOLE TABLE.

By Paul D. Otter.

THE heating of the residence to-day from some hidden source, the furnace or boiler, gives little excuse for the mantel, much less the make believe chimney breast. This naturally has brought back the console to break the blank wall space. While at one time or another in its use it was somewhat of a movable piece classed among furniture, this was due no doubt to the fact that an elaborately framed mirror was hung immediately over the wall or half table, creating an opportunity for the incoming or outgoing to arrange their hair and wraps in a manner entirely satisfactory to themselves. Then, too, the mirrored expanse of glass reflects and apparently makes double at first impression one's possessions and of the illustrations. Fig. 1 is visibly portable, while Fig. 2 is constructed in such a manner as to be set flat to the wall and there fastened, after having cut away the surbase for perfect contact with the wall. Both are within the space of 35 x 87 inches, although this is optional, the point being that of the proportion shown, or rather to have a decided mirror surface of an elongated form and that the top reach to the top of the window cap, thus forming a close relation with the picture mold and the general trim. The two patterns, it is hoped, will represent a modified type which will not disturb the general plans of a modern room. Fig. 2, we may state, fits a room more properly than Fig. 1, should the furniture be their arrangement far more than did the usual small mirror above the mantel.

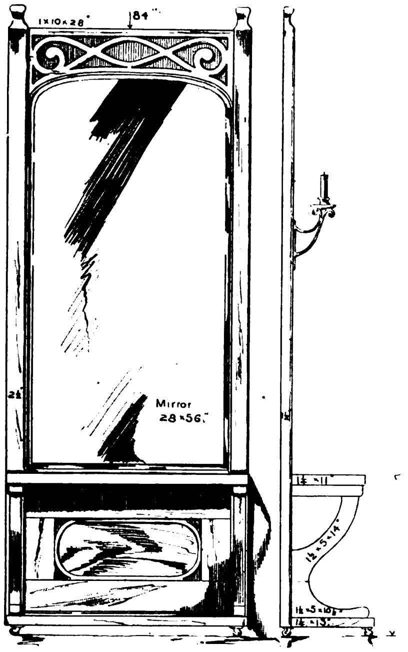


Fig. 1.—Portable Console Table.

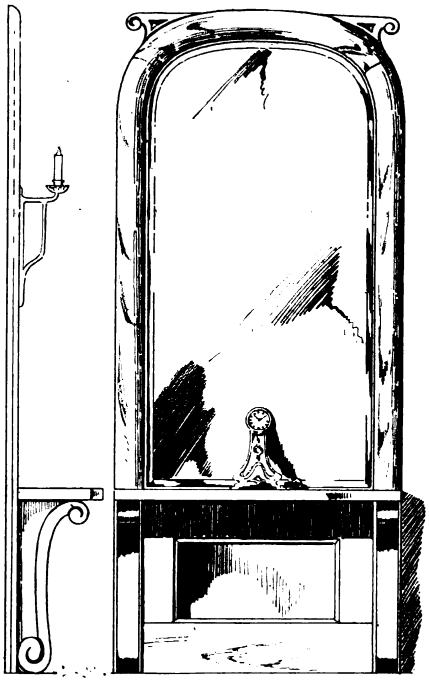


Fig. 2.—Fixed Console Table.

Cabinet Work for the Carpenter.—The Console Table.

The console table, as well as many other furniture pieces, has been remodeled along the lines of present day thought, and the mirror and table are joined, having the form of a fixed wall framing, with a table—or, more properly speaking, a shelf—supported by consoles, brackets, short columns or a paneled base in conformity with the nature of a surbase and all that is above partaking of the character of the interior trim.

In considering the building of a console table for the parlor, reception hall or other room not provided with mantel or fireplace a little thought should be given to its most favorable location. Very frequently the wall space between two side windows is an excellent situation for it. Should there also be a front window to throw light on the mirror the impression of much more light and brightness will then be conveyed. The home should be a reflection of the occupants. Many a remark is made: "Jones' house is always cheerful and cozy; I like to go there." Why? No doubt Jones gave some thought to the proper places for windows to let the good light and air do what nothing else ever did in place of it.

Two drawings of consoles are offered in Figs. 1 and 2 all of a smooth, highly finished character. The design shown in Fig. 1 partakes more of the nature of the prevailing trend of the modern style. In Fig. 1, as well as in Fig. 2, the stiles reach to the floor and the framed panel under the shelf is set in by dowels as would be a rail. A careful selection of grain is an important feature in the paneling as well as in the upper portions. The lower shelf in Fig. 1 affords a place for a much prized urn or other object of art, while one of the many handsome clocks to be had may with propriety be placed on the shelf before the mirror.

Rooms not supplied with overhead lights make it desirable to provide side candle sconces for ornament and for festive occasions. The treatment of the top rail is offered as the nearest approach within the range of the carpenter short of carving, which generally finds a place on such a surface. The panel consists of ½-inch background, upon which is glued ½-inch fret work panel, as suggested. This in turn may be worked upon to all appearances like carving by rounding off the edges and making clear the scrolls, at the same time treating the design as interlacing straps, then in the after finish leaving the background a dull finish.

To the person executing such a console the mirror

will be the main item of cost, but will be small in comparison to the value of the piece completed. Herein the craftsman has the advantage of surrounding himself with many objects at very little cost when the labor is not reckoned. The plate glass in the pattern shown is 28 x 56 inches, with beveled edges. Instead of inserting this within a rabbet provided for it from the back, a rabbet is cut on the stiles and top rail and filled in with ⅜-inch lining, after which the console is completed and finished. The glass is inserted from the front and set against the lining, and a neat, small molding is then pressed along the edge and securely bradded. This, it may be remarked, should previously be finished.

The proportions and finish given in the pattern shown in Fig. 1 will properly apply to Fig. 2. The bracket or console supports consist of a 2-inch center, with ¼-inch scroll pieces glued to each edge and finished smooth on the front. The shelf has a slight ogee front edge. In making the stilted round to the top a felloe joint should be made, as a lap joint in the after rounding would not look as well. It will be noted that the inner edges of the stiles will require adding to somewhat below the joint in order to secure the finished arched line. The final rounding and smoothing over this joint should of course be done after the frame has been fitted perfectly and glued up tight: then, and only then, can be secured that complete "oneness" of line and surface which is embodied in good furniture. The projected scroll ends may be an after application.

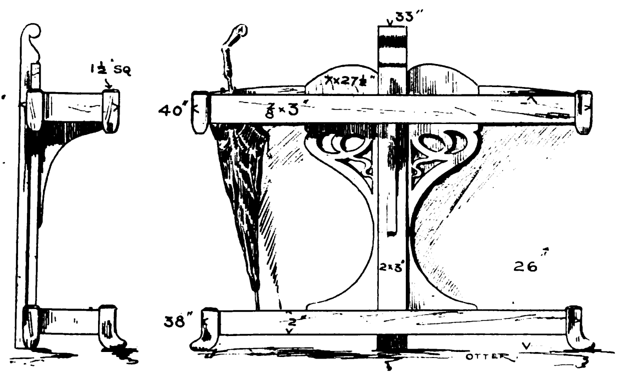


Fig. 3.—Umbrella Stand for Large Family.

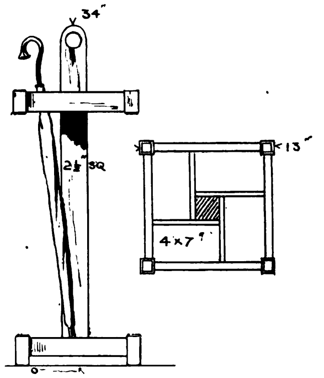


Fig. 4.—A Small Umbrella Stand.

Cabinet Work for the Carpenter.—The Console Table.

The Umbrella Stand.—It is an old saying that "all things come to him who waits," but many acquire "things" after they have secured the purchasing power. The handy man's wife acquires many articles after patient waiting on her husband's ability to "just get around to it." The umbrella stand, while not of vital importance, is not the least of many articles that some day we will get around to having. Meanwhile in the more pioneer days of home building the corner of the wall in the hall supported the umbrellas at various unsightly angles. For the large family the pattern shown in Fig. 3 will fulfill all requirements. The perforated center adjoining the middle post is cut from one length of board and the edges doweled and glued to each side of the post and flush with the front face. To the outer edges is secured the back part, as shown, entering the block corner seen in the side and front views. Before the divisions are placed a ½-inch batten should span the back part across the front of the post and between the back corner blocks, being glued and firmly secured to each piece by brads. This will insure greater strength for the four-part back. The bottom of the base is floored and may be zinc lined, or the bottom may have grooves running to the center hole, in which a pan is placed to receive the water that may drip from the umbrellas. Inasmuch as umbrellas properly cared for should be opened out to dry, pans in the homes are hardly needed. Fig. 3 is planned for four compartments, but its entire length may be shortened for three openings if desired. For a small stand Fig. 4 will be found serviceable to go in a certain corner. The arrangement for the top is the same as shown in the plan, compartments being built around a 2½-inch square post and the sides set in 1½-inch square blocks with chamfered edges. A dull oil finish will be found most satisfactory to apply to this character of furniture.

Commencement Exercises of the New York Trade School.

The twenty-fifth annual commencement exercises of the New York Trade School, First avenue and Sixty-seventh street, New York City, were held in the auditorium Friday evening, April 6, in the presence of more than 1000 students and their friends. A number of prominent tradesmen and trustees of the school occupied seats on the rostrum when the president, R. Fulton Cutting, addressed the audience. He expressed gratification at the excellent work of the students, but disappointment over the fact that it had been necessary to turn away some 200 or 300 young men owing to lack of facilities. He made this fact the statement that the institution was in need of more endowment in order to do the work being forced upon it by the American boys who want a chance to learn a trade. After giving the young men some timely advice, pointing the way to success in life, President Cutting introduced T. A. Hill, president of the Manhattan Branch of the Master Plumbers' Association, who spoke directly to those engaged in acquiring a knowledge of that particular branch.

At the close of Mr. Hill's remarks, President Cutting announced that the certificates would be given to the graduates by T. S. Cochrane, Jr., secretary of the New York Master Plumbers' Association, and John H. McCullagh, from the General Society of Mechanics and Tradesmen. The gold medal donated by the Master Steam Fitters' Association was awarded to G. A. Dornheim of New York City.

The speaker at the close of the exercises was Prof. Franklin H. Giddings of Columbia University, who referred, among other things, to the "true man and the honest man as the one doing his work honestly, faithfully and truly." That character, he said, which lays brick straight and true to the line and makes the tight joint is needed, and such men can be depended on in all life work. Every skillful, honest craftsman may rightly say as the result of his schooling, "I am of more value as a citizen and of more value as an American." One of the important questions of the times and one which confronts the rising generation is, What shall be the relation between labor and employer—unions and the "open shop," or the system characteristic of our social life.

The list of graduates numbered 12 in the class in carpentry, 12 in bricklaying, 3 in plastering, 22 in cornice work, 106 in plumbing and 23 in steam and hot water fitting.

WHAT BUILDERS ARE DOING.

ADVICES received from various parts of the country indicate that the inclement weather of March had a more or less retarding influence upon building operations generally. Taking a series of cities, the number showing a decrease in operations as compared with a year ago at this season is fully as great as the number showing an increase, with the net result a slight decline for the month. Were it not for the fact that in one or two small places the percentage of increase over last year was unusually large the net decline in building operations for the month would be very appreciable. A noticeable feature of the situation on the Pacific Slope is the number of large buildings which are under way or projected, and which in the case of San Francisco are more numerous than at any previous time in the history of the city. In fact, in many centers there appears to be a strong tendency toward the erection of an increased number of large buildings, which is in striking contrast to conditions which prevailed last year. As regards the labor situation there is nothing on the surface to indicate any serious interruption to building operations, and the feeling quite generally prevails that the season now opening will be highly satisfactory in all respects.

Atlanta, Ga.

The season is opening with exceedingly bright prospects and judging from the figures compiled in the office of Building Inspector Frank A. Pittman, mechanics in all branches will be kept busy. The value of the improvements for which permits are issued continues to show an increase over the same period last year. For example, the value of building operations for March, 1906, is placed at $521,938, while in March of last year the figures were $368,507.

Reviewing the first quarter of the current year, the figures are no less striking than those for March, and show an increase over the corresponding period of 1905 of nearly $500,000. In January of this year the value of the contemplated improvements was $300,808, as against $143,715 in 1905. For February of the current year the value was $301,249, as against $130,858, and for March as already stated. The total for the first quarter of 1906 is $1,123,995, as against $637,080 in the first quarter of 1905. These figures prove in a most conclusive manner that the people are building homes, factories, hotels and other structures, and indicate a steady growth of the city.

Boston, Mass.

We have received from William H. Sayward, secretary, a copy of the year book just issued by the Master Builders' Association of Boston for 1906. It is a work of 120 pages, bound in Russia leather covers, with gold side title, of a size which renders it convenient to carry in the pocket. The information contained within its covers is of special interest and value to members of similar associations all over the country, relating as it does to the origin of the Master Builders' Association of Boston, the charter, preamble to by-laws, architects' privileges, the uniform contract, forms of estimate for general contractors' and subcontractors' use, the code of practice, rights of the lowest bidder, labor issues, form of arbitration, programme in labor issues, court decisions, &c. The illustrations consist of exterior and interior views of the building occupied by the association in Devonshire street. There is a list of the Board of Management of the association, the standing committees for 1906 and the days of the regular meetings of the corporation, together with the names of past officers and an alphabetical list of the members, as well as a list of members by trades.

Chicago, Ill.

The touch of winter weather which was experienced in March seriously interfered with building operations in the city, so that it is not strange that the figures of the Building Department should show a falling off as compared with 1905. There was not only an interruption in actual construction, but it also caused prospective builders to hold off to such an extent as to be reflected in the offices of the architects. Notwithstanding the inclement weather, however, there were 926 permits issued for improvements, estimated to cost $4,267,650, as against 665 permits for building improvements, estimated to cost $6,116,655, in March of last year.

The nineteenth annual exhibition of the Chicago Architectural Club, which closed on April 18, afforded opportunity for an inspection of a large number of studies, including among others hospitals, school buildings, apartment houses, private dwellings, &c.

Cleveland, Ohio.

The building situation in and about the city at the present time is a great improvement upon that which has existed for a long time past at this particular season. The various wage scales of the unions in the building trades have always terminated on April 1, and the attempt to adjust new scales has sometimes developed friction, resulting in strikes. Last year April 1 found the members of seven unions connected with the building trades out on strike, principal among which may be mentioned the carpenters, bricklayers, gravel roofers, slate roofers, tin roofers and tile layers. The carpenters' strike is still on, but most of the members of the union are at work. On April 1 the Carpenter Contractors' Association advanced wages voluntarily 2½ cents an hour. At present there is no trouble in sight and it would appear that the spring of 1906 will be a quiet one in Cleveland, so far as union troubles are concerned.

It is interesting to note that the conditions indicated above are being reflected in an increased number of projected improvements, the value of which shows a large percentage of excess as compared with a year ago. During the month of March 564 permits were taken out, covering building projects valued at $1,235,000, while in the same month of last year there were 534 permits taken out for building improvements, involving an outlay of $858,065.

Grand Rapids, Mich.

The members of the Grand Rapids Building and Contractors' Association held their first annual banquet at the Hotel Pantlind on the evening of March 22. The gathering was of an entirely social character, and after the good things provided to eat and drink had been fully considered several of the members responded to toasts, the master of ceremonies being Charles A. Hauser.

The officers of the association elected at the meeting are: President, P. C. Campbell; vice-president, Edwin Owens; secretary, Harry Hoskens, and treasurer, Paul Richens.

During the evening music was furnished by Hill's Concert Orchestra, and the affair was so enjoyable in every way that the association voted to hold them more frequently hereafter than once a year.

Los Angeles, Cal.

With the opening of spring building began in Los Angeles with a rush, and by the end of the month the improvements undertaken had amounted to nearly double the value of those undertaken during the month preceding, and to almost double the value of those for March, 1905. During March there were issued a total of 927 building permits for improvements, valued at $2,165,307, as compared with a total valuation of $1,082,875 for February. During March last year there were 762 permits, aggregating $1,176,163 in value, and for March, 1904, 578 permits, aggregating $951,029. Among the permits issued during the month were two for reinforced concrete buildings, valued at $185,000; one for a seven-story brick building, valued at $250,000, and one for a six-story brick building, valued at $100,000.

The outlook is for a very active season, with a larger proportion of heavy construction than was the case during 1905. There is also a good demand for the better class of residences in the 1½ and 2 story classes. A large amount of building of a public or semipublic nature is planned for the year. The labor situation is satisfactory. Building materials are high, though no large advances are reported. With the exception of cement all materials are in fair supply.

Minneapolis, Minn.

Building figures for Minneapolis for the first quarter of the present year show a marked increase over the corresponding quarter for 1905. The total value of the 701 permits issued during the first three months of this year amounts to $1,686,425, as compared with $1,502,635 for the corresponding three months of last year. The figures for March, however, show a falling off as compared with those for the same month a year ago, being $459,155 and $866,922, respectively. The outlook for building and construction work in Minneapolis during the coming season is set down by the oldest architects and builders here as the best in the history of the city. According to a forecast recently prepared by the Minneapolis *Tribune*, the total figures of all buildings to cost $50,000 or upward that are projected this year will equal the entire building total for last year. The force of this statement will be seen when it is remembered that last year, as in most other years in the immediate past, the total for the above class of buildings never exceeded 40 per cent. of the entire building total for the year.

The fact is, the number of large buildings projected for the coming year is enormously in excess of anything ever heretofore known in the city's history. Included in the list of what for convenience are termed "large" buildings are structures of nearly every type to be found in a large city, from a first-class hotel to an "institutional" church, and from a club house to a modern warehouse and freight depot. The district that will be the scene of the most building during the coming year will undoubtedly be what is known as the North Minneapolis wholesale district, which embraces

that section of the city lying between Tenth avenue north, Tenth street north, Hennepin avenue and the river. At the same time the number of buildings that are projected for the district lying between Hennepin avenue, Tenth avenue south, Tenth street south and the river, is so great that the name of the South Minneapolis wholesale district has been coined to designate that section of the city.

In the North Minneapolis wholesale district a count of the large buildings that are now under consideration shows that no less than a dozen warehouses and wholesale buildings are likely to be put up in that section within the next twelvemonth, at a cost ranging from $50,000 to $200,000 each.

In the South Minneapolis wholesale district the buildings that are planned, to cost between $50,000 and $150,000, are the J. I. Case Company's warehouse, the McQuaid Company's wholesale building, the Kellogg, Mackay & Cameron building, the "Soo" freight depot, the Wisconsin Central warehouse, the Smith & Zimmer building, the Washburn-Crosby warehouse, the New England Carpet & Furniture Company's building and the Manchester Bank building.

Among the buildings for other than business purposes that are to be erected in the city this year are an unusual number of churches, that will cost upwards of $50,000 each.

New York City.

The amount of building which is in progress as the season opens compares very favorably with last year, for while the number of permits issued for the first quarter is practically the same as in the corresponding period of 1905 the estimated value of the improvements shows a gratifying increase, thus indicating a somewhat better class of structures. While this applies to the Boroughs of Manhattan and the Bronx, the figures for Brooklyn are practically unchanged from last year. As, however, an unusual amount of work was done at that time, the present showing is highly gratifying.

The friction with the Housesmiths' and Bridgemen's Union has not been finally adjusted and there seems to be an undercurrent of feeling that a crisis will be reached on May 1, when the building season is regarded as being officially opened.

At the meeting of the Building Trades Employers' Association, held April 10, Isaac A. Hopper, formerly superintendent of the Department of Buildings of the Borough of Manhattan, was unanimously elected president; Benjamin B. Traitel was chosen first vice-president; Ross F. Tucker second vice-president; Paul Starrett treasurer, and Lewis Harding was selected as chairman for the Board of Governors.

The annual meeting of the Association of Dealers in Masons' Building Materials was held at the association rooms, 18 Broadway, on March 15, and was preceded by a luncheon served by Delmonico. Reports were received and the regular ticket was unanimously elected, as follows: President, Francis N. Howland; vice-president, John A. Philbrick; treasurer, Nathan Peck.

Newark, Ohio.

The leading builders, contractors and others allied with the building business recently held a meeting in the court house and reorganized the Builders' Exchange. Various matters of interest were discussed and officers and trustees for the ensuing year were elected as follows:

President, P. S. Phillips; vice-president, B. B. Jones; secretary, H. A. Bailey, and treasurer, E. W. Crayton.

The trustees are James Linn, B. B. Jones and David Taylor.

Norfolk, Va.

The Master Builders' Association of Norfolk held a meeting on the evening of March 30, when the following officers and directors were chosen for the ensuing year: President, C. R. Parlett; first vice-president, George T. Banks; second vice-president, C. H. East; secretary, A. Christe, and treasurer, E. J. Myers.

The directors consist of I. B. Betts, Jr., W. T. Gregory, Z. B. Capps, S. G. Williams and the officers.

At a regular meeting held the first week in April the association unanimously adopted the following resolutions: "That on and after April 7, 1906, a minimum rate of 38 cents per hour, and a maximum rate of 44 cents per hour, be given to carpenters, but that the so-called card system of the union will not be recognized, the contractors reserving the right to employ a man strictly on his own individual merits as a mechanic and a workman, regardless as to whether he does or does not belong to the union."

Philadelphia, Pa.

The building of a large number of dwellings, both of the two and three story types, continues to be the leading feature in the building trades. Operation work is being conducted on a very large scale, in some cases upward of 100 dwelling houses being included in one contract, while those covering 10, 20, or even 30 houses in one operation have been quite numerous.

Statistics from the Bureau of Building Inspection show that 876 permits for 2.034 operations, at an estimated cost of $5,132,545, were taken out during the month of March, exceeding the previous month by 331 permits, and estimated cost by $2,068,525.

During the first three months of the present year permits have been taken out authorizing an expenditure of $9,934,585, exceeding that of the same period during 1906 by $1,419,605.

Permits taken out during March for two, three and four story dwellings numbered 261, to be erected at an estimated cost of $3,621,650. The increase in this field alone, over the month of February, aggregated $1,531,350. Statistics also show that the cost of building has materially increased, the cost of construction work having advanced about 40 per cent. during the past ten years. In 1896 the approximate cost of a two-story dwelling was $1500, but owing to increased cost of materials and advances in wages to mechanics and laborers in the trade the cost has been gradually increased from year to year, the average cost during 1906 being $2029. In addition to the large number of permits taken for dwellings during the month of February there has been some increased activity in other building lines, work being started on 30 manufacturing plants and warehouses, at a cost of over $500,000; several churches, at a cost of nearly $200,000, and an apartment house costing $120,000.

Weather conditions during March were less favorable for outside work than in any month during the past winter. A large volume of work was started, however, and the present activity of the trade is believed to be unprecedented. With the vast amount of work now under way a continuous active condition of the trade is assured for many months. Builders' materials are in excellent demand and in many cases deliveries very hard to obtain. The labor situation is good, there being no difficulties of any moment in sight at the present time. Mechanics are well occupied and skilled labor is scarce in many of the different branches of the trade.

Among some of the prominent building operations recently started was one by Erick A. Anderson for 65 two-story dwellings and three two-story stores and dwellings, the estimated cost being $103,200. These are to be located in the southern section of the city.

John M. Whelan is about to begin work on an operation covering 33 two-story houses, 15 x 38 feet each, in the northeastern portion of the city. These will be erected at a cost of about $50,000.

Edward F. Gorman will erect 37 two-story brick and stone dwellings at Fiftieth and Westminster avenue, each 14 x 36 feet, involving a cost of about $90,000.

Joseph C. Allen has started work on an operation in the vicinity of Sixtieth and Catherine streets, West Philadelphia, including 46 two-story houses, four two-story stores and dwellings, and four three-story stores and dwellings, to cost, it is estimated, nearly $150,000.

Pittsburgh, Pa.

The disagreeable weather which was experienced during the month of March appears to have had little if any effect on contemplated building improvements in the city, for according to the report of Superintendent S. A. Dies of the Bureau of Building Inspection, there were 349 permits issued for new buildings, estimated to cost $1,124,918. These figures compare with 330 permits issued in March of last year for building improvements, estimated to cost $468,238.

The first three months of this year have shown a large increase in the matter of building operations, as compared with the same months last year, the value of improvements being $2,908,129, as against $1,464,378 for the same time in 1905. The general outlook for spring business in all branches of the building trades seem to be in satisfactory shape for making 1906 a prosperous year. The labor troubles that have been experienced for several years past have not made themselves apparent so far this year, with the possible exception of the carpenters in the Allegheny district, who have asked for an increase of 50 cents per day. It is the general opinion that an agreement satisfactory to both the Master Builders' Association and the workmen will be arranged without trouble.

The estimated cost of buildings that are under course of construction and for which plans have been completed has been placed at $15,000,000. The amount covers the cost of office buildings, stores, churches, clubs and residences in Pittsburgh and towns adjacent, including the following office buildings: The Berger Building, the Union National Bank Building and the Commonwealth Bank Building, all on Fourth avenue; the First National Bank Building on Fifth avenue, and the proposed building to be located at Diamond and Wood streets, which is to be built by H. C. Frick, the plans for which are said to be for a building 26 stories in hight and which will cost not less than $2,500,000.

Portland, Ore.

The improvement in weather conditions has opened the way for a large amount of building, and during the last half of March the volume of new work undertaken was unusually large. So far most of the new work consists of residence building, though several large structures have been started. Builders report that the labor situation is satisfactory and

that unless a shortage of cement or other building materials interferes, the building record for the coming summer will be large.

San Francisco, Cal.

The present outlook is for one of the greatest building years ever known in San Francisco. The months of February and March were marked by almost continual rains, which retarded the commencing of new buildings, but there is a great deal of work in progress nevertheless, and the architects' offices are busy completing plans and making estimates for proposed structures. There are more large steel frame buildings in course of erection than at any previous time in the city's history. Almost every variety of structure is included in the list of buildings under construction and projected, from 18-story office buildings, hotels, warehouses, hospitals, theaters and apartment houses, to churches and palatial residences in the suburbs.

Work has commenced on the foundations of the new Custom House, which will be erected by Thomas Butler, contractor, for $1,194,000, not including the interior finish. Another movement has been inaugurated by prominent citizens for the construction of a grand opera house on a scale of magnificence worthy of the present commercial importance of San Francisco and its prospectively great population in the not far distant future. The fact that over $100,000 advance sales have been made for seats for the Conried opera season of 16 performances indicates that a large modern opera house would pay in this city, which is well supplied with theaters at present. One thing that is lacking here, however, is a modern railroad passenger station for the accommodation of thousands of persons going and coming on the coast lines of the principal trans-continental railroad entering the city. The greater part of the passenger traffic at present goes via the ferries to the train sheds across the bay, and the State Harbor Commissioners have erected a magnificent and spacious ferry depot that is a credit to the city. The railroad company has as yet erected nothing in the way of a passenger station that would be a credit to a town of 10,000 population. The Western Pacific Railroad is expected to have its new line completed in three years, when something more pretentious in the way of a station may be expected, but there is little prospect of a modern union depot.

Building materials are in only fairly good supply. Fir lumber is scarce and the stocks in the yards are broken, not having been replenished since the period of winter dullness. Retail prices have advanced $2 a thousand, and there is quite a possibility of a shortage of lumber if the present building prospects are realized. The enormous demand for fir lumber in the East keeps the mill owners busy supplying the car trade, and they are somewhat indifferent to cargo shipments to the lower priced California markets. Common brick can easily be supplied for all building requirements at moderate prices. Pressed brick are in greater demand at good prices, and there is a fair supply, as a number of the newer plants run all the year, while the older soft mud plants are still shut down for the rainy season. Sand brick are gaining in favor, although only two or three of the plants that have been erected for their manufacture are now in operation. Structural steel is in better supply, and it is possible that the vexatious delays in delivery last year will not be repeated this season. The cement famine continues, and foundation work will be expensive this year, and contractors are fortunate who have ordered far ahead. Sales of real estate in the city during the past few months have been phenomenally large, and many of the new owners will proceed to erect large buildings on the properties. The March transactions amounted to about $16,000,000.

The Orpheum Theater property on O'Farrell street has been sold for $500,000, and a new 12-story theater and business block will replace the present 2-story structure. President Myerfeld of the Orpheum says that the new structure will be similar in its arrangements to the Orpheum Building in Chicago, which is 20 stories high. The new building will be absolutely fireproof and will probably cost about $800,000. There will be an alleyway all around the building, and the theater entrance, with a large vestibule, will be on the east front of the lot. The O'Farrell street front will be devoted to stores and offices.

Claus Spreckels is preparing to erect another large structure on Third street, extending to within 25 feet of his present tall building at the southwest corner of Third and Market streets. A fireproof building of stone 14 stories in hight is in contemplation. The lot has a frontage of 75 feet on Third street and 95 feet on Stevenson street.

George Heazelton, who recently purchased the lot 30 x 77½ feet at the intersection of Market and Bush and Battery streets, will erect a 12-story fireproof building of brick and terra cotta on the property.

San Jose, Cal.

The members of the Builders' Exchange held their first annual banquet on the evening of Tuesday, February 27, with representatives present from the leading branches of the building and allied industries. During the evening music was furnished by Brohaska's orchestra. The toastmaster of the evening was G. W. Borchers, who in his opening address stated that the aim was to induce members to take an interest in the meetings of the exchange, which existed for the benefit of every individual member and for good of all. J. H. Lawrence spoke in the interests of the exchange, suggesting the discussion at the various meetings of public improvements in municipal affairs and pointing out the great importance of the need of organization among contractors and builders. He referred to the problems requiring the best wisdom of the men who had the best interests of the city at heart, and he asked where there could be found men better fitted to handle these practical problems of the day than in the ranks of those who construct the buildings. The next speaker introduced by Toastmaster Borchers was R. Herring of San Francisco. He told of the work of organization in that city and impressed upon the members the idea that there was nothing like organization, and told of the obligations of membership in an exchange. Another speaker was William Binder of San José, who spoke from the standpoint of the architect. Secretary Wilson of the San Francisco Exchange spoke on the general benefits of organization, illustrating his remarks with many apt anecdotes.

Worcester, Mass.

The members of the Builders' Exchange held their eighteenth annual banquet in the State Mutual Restaurant on the evening of March 21, there being present about 130 members and guests. The tables were decorated with roses and carnations and the music was rendered by the Infantry Orchestra. D. C. Fiske was master of ceremonies, and after the menu provided had been properly considered the speakers of the evening were introduced. The first of these was E. J. Cross, president of the exchange, who stated that there had never been a time in its history when a better feeling existed among the members as well as between employers and employees. He expressed the opinion that there was probably not another city in the country the size of Worcester which has had so little friction between the employers of labor and their men, and he believed it chiefly due to the organization of the Builders' Exchange and the interest the members took in maintaining friendly relations among themselves and with the men who worked for them. Mr. Cross was followed by Mayor J. T. Duggan, who briefly expressed his pleasure at being present on that occasion.

When the speaking had been concluded there was an entertainment of a vaudeville character, many of the numbers provoking a great deal of laughter, especially when the jokes were on the members.

The Committee of Arrangement consisted of George W. Carr, H. C. Wilson, B. F. Marsh and R. C. Cleveland.

Spokane, Wash.

The present is evidently to be a year of large things among contractors and builders, for it is conservatively estimated that the work to be done will amount to $6,000,000, and may reach $10,000,000. This year there will be many buildings erected which will cost over $100,000. The United States Government will probably commence the erection of its $500,000 building, on a site for which $100,000 already has been paid. Ex-Senator George Turner has the foundation laid and part of the steel work in for an eight-story office building, which will cost $300,000. The State of Washington is putting up an $85,000 armory building, which will seat 4000 people, and will be used for bringing national conventions to Spokane. August Paulson, one of the newly made millionaires of the Hercules group of capitalists, will put up a building at Monroe street and Riverside avenue, which probably will be eight stories high.

Frank P. Hogan is having plans drawn by Cutter & Malmgrem, for a five-story brick building, 101 x 155 feet, to be erected on the southeast corner of First avenue and Madison street. It is to be fitted up in fine style, will have probably the largest elevator in the city and will be partly occupied by the Blair business college. Thomas L. Greenough will erect a four-story building, 150 x 150 feet in size and costing $200,000, which will be occupied entirely as a department store by Kemp & Hebert, who have been in the dry goods and boot and shoe business for several years in this city.

The value of building permits issued during the first three months of the present year is as follows:

January	$105,355
February	322,776
March	479,175

Not one building material needed is lacking in this city, for within easy reach are found fine limestone and granite, and a short distance away, in Stevens county, are fine Onyx and marble deposits. Spokane people are using these extensively in their public buildings. Lumber is cheaper in Spokane than in many cities, and there is a great variety from which to choose. The clay deposits make as fine brick as is found anywhere. Red predominates, but there are many buildings made of cream and buff colored brick.

Tacoma, Wash.

During the month of March the building activity in Tacoma exceeded all previous records. Building operations for the month approximated $400,000, as compared with a

little less than $250,000 for the best previous month—that of March, 1905. During the month architects and builders were rushed, and in some cases a scarcity of labor developed. Aside from a threatened shortage of labor to meet the unusual demand and a scarcity of cement, everything looks propitious for an active year. A good deal of heavy building has already been undertaken and plans are under way for a number of others. During March five large structures, each averaging over $50,000 in estimated cost, were begun. In buildings ranging from $1000 to $4500 the total reaches the sum of $88,000.

Notes.

Instead of going on strike the first week in April, as was anticipated, the carpenters of Hazleton, Pa., accepted an increase in wages whereby they will hereafter receive $3.36 per day.

An agreement has been reached between the bricklayers and master builders of Easton, Pa., whereby on and after May 1 eight hours shall constitute a day's work for the bricklayers.

The carpenter contractors of La Crosse, Wis., have signed a scale by which carpenters are to be paid at the rate of 30 cents per hour and eight hours to constitute a day's work. The contractors, however, maintain the "open shop" policy, reserving the right to employ both union and non-union men.

Contractors, material men and manufacturers of Stillwater, Minn., have recently organized a Builders' and Manufacturers' Exchange, one of the features of which will be to adjust differences by arbitration and to encourage the location of new industries in the city. The officers elected were: President, R. Robert; first vice-president, J. D. Bronson; second vice-president, O. H. Olson, and secretary-treasurer, John J. Kelty.

According to the report of Inspector Robert A. Willison building operations in Denver, Colo., for March, were far ahead of any corresponding month in the matter of permits issued. It will be recalled that March of last year was the banner month since the establishment of the department several years ago, and the amount of work then projected has not been equaled in any month until the March just past.

LAW IN THE BUILDING TRADES.

BY W. J. STANTON.

CONTRACTOR ENTITLED TO MECHANIC'S LIEN.

A contractor installing a kitchen equipment in a hotel and attaching the same to the building, in accordance with the owner's intention that it should permanently become a part of the building, is entitled to the mechanic's lien. This point was decided in the case of Porch vs. Agnew, New Jersey Court of Chancery.

DESIGNATIONS OF MATERIALS FURNISHED.

A mechanic's lien statement, in which at the head of the first column on each page appeared the word "lumber," underneath which were numerical abbreviated verbal designations of different kinds of lumber furnished, which abbreviations were understood in trade and employed constantly in making out bills and stating accounts, was held in Kniesley Lumber Company *vs.* Stoddard, St. Louis Court of Appeals, to be sufficiently full and definite as to the items of material furnished.

BUILDING CONTRACTOR ENTITLED TO LIEN.

A building contractor who has failed unintentionally to perform unimportant details of his contract is held, in Burke *vs.* Coyne, Supreme Court of Massachusetts, entitled to a lien for the value of labor and materials not exceeding the stipulated price. It is no bar to his recovery that there has not been a full performance, and the acceptance by the owner of plumbing done under a building contract is a waiver of slight defects in performance in an action to establish a mechanic's lien.

WHEN NOTICE OF MECHANIC'S LIEN IS INSUFFICIENT.

A notice of a mechanic's lien filed by a subcontractor stating that "the labor performed and to be performed and the materials furnished and to be furnished consists of electrical apparatus," &c., at an agreed price, stating it, is held insufficient in the case of Alexander *vs.* Hollender, New York Supreme Court, in not stating how much is claimed for labor and how much for material and how much is still to be furnished.

WHEN SUBCONTRACTOR IS ENTITLED TO LIEN.

A subcontractor under a contract with the principal contractor to carve and erect in place and finish all the exterior marble work, employed because of his skill in the class of work, who does the work in the sense of giving it intelligent direction, and who is responsible for its proper execution, is entitled to a lien for his compensation under the laws of Maryland, subjecting every building to a lien for the payment for work done thereon. The court held that the subcontractor did work "on or about" the building within the meaning of the statute.

CHARGES FOR EXTRAS.

A subcontractor's contract provided that they should cover, protect and secure the work from injury; that any damage thereto should be repaired at the contractor's expense, and that the inspection of any work by the architects, or the issuance of certificates thereon by them, or payments under the contract, should not release the contractors from any obligation to perform the work in a good and workmanlike manner, and any default or defect in the same, with all damages thereto, should be repaired and replaced or made good by the contractors at their own cost or expense. Under this contract the Michigan Supreme Court held that where water conductor pipes were placed within 4 inches of the outside face of the wall, as provided by the plans and specifications, and were accepted after being first tested, but were subsequently damaged by frost because of the failure of other contractors to supply steam with which to warm them, as contemplated, the subcontractors were not required to insert new pipes under the contract, but could charge for them as extras.

FOREIGN CORPORATION HAS RIGHT TO FILE LIEN.

The statutes of New York (laws of 1897, chapter 418, section 3), in relation to mechanic's liens, provides that a contractor, &c., who performs labor or furnishes materials for the improvement of real property shall have a lien for the principal and interest of the value or the agreed price. The Supreme Court of New York, in the case of New York Architectural Terra Cotta Company *vs.* Williams, have construed this statute to give a foreign corporation a right to file a mechanic's lien to secure the price of materials furnished.

WHEN GAS APPLIANCES ARE NOT "FIXTURES."

The Appellate Court of Missouri have decided in the case of Frank Adam Electric Company *vs.* Gottlieb that gas appliances, such as pendants, chandeliers, brackets and globes, are not fixtures or lienable articles within the statute giving liens for materials furnished and labor done on buildings, in the absence of evidence of an intention on the part of the owner when he has them put in to make them permanent parts of the building, and such intention is not shown by the mere fact that they are put in by the original owner of the building and remain in the same after it is sold by him to another.

WHAT CONSTITUTES BREACH OF CONTRACT.

Where a building contract provided for the making of payments "as work progresses," the refusal of the owner to comply with a demand for partial payment made after substantially one-half of the labor and materials had been performed and furnished was a breach of the contract which excused the contractor from proceeding further with the work, and authorized a recovery and the enforcement of a lien by him for the value of the material furnished and the work performed, without the completion of the balance of the work. This was decided by the Supreme Court of New York in a recent case.

WHEN DIFFERENT LOTS OF BUILDING MATERIALS ARE SUBJECT TO LIEN FOR ENTIRE DEBT.

Where a contract for improvements showed that the material and labor were furnished for three different houses under a single contract, failing to specify how much could be used or expended on each respective house and there was no agreement as to the price of material and labor expended on each house, each separate lot is subject to a lien for the entire debt, and subsequent purchasers are not entitled to complain that their lots were held for the entire debt. This principle is held in the case of Guarantee Savings & Investment Company *vs.* Cash, decided by the Court of Civil Appeals of Texas.

New Publications.

The Estimator's Price Book and Pocket Companion.—By I. P. Hicks, author of "Hicks' Builders' Guide"; 172 pages. Size, 4 x 6¼ inches. Bound in board covers. Published by the David Williams Company, 14 and 16 Park place, New York City. Price, $1 postpaid.

This little work by the well-known author of "Hicks' Builders' Guide" has been prepared as an aid to the estimator by placing in his hands such information and prices of material of every description as will enable him to reach approximately correct figures in making estimates of building work without the necessity of consulting numerous trade catalogues. Practically every important item in connection with ordinary building construction has been considered, together with average market prices, but in order to provide for variations in figures, as they may obtain in different localities, blank lines have been provided for the contractor, so that he can fill in local prices where it is found desirable to do so and thus make the little work a price book well adapted to his individual wants. In the arrangement of the matter the convenience of the estimator has been carefully considered and the disposition of the items has been such as to enable him to rapidly find what is wanted in regard to size, weight and prices. The author points out that the field covered by the well-known "Builders' Guide" has not been encroached upon to any extent, but that the present work is designed rather to supplement the section of that useful hand book, which relates to estimating with a more comprehensive reference to prices of material and labor.

It is well known that estimating is one of the most vital factors in the building business and that upon the correctness of a builder's estimate will greatly depend whether the contract will result in a profit or a loss. This guide to prices of all kinds of building materials, together with handy rules, tables, &c., will be found an admirable reminder of items and costs which are to be taken into consideration in making an accurate estimate of any piece of work which the builder may be called upon to execute.

Baughman's Buyer and Seller.—By H. R. A. Baughman; 174 pages. Size 4½ x 6¾ inches. Published by the author. Bound in flexible cloth, $1; bound in flexible leather, $1.25, and bound in full leather, $2, postpaid.

This is the fifth edition of a little work which will be found of special interest and value to lumbermen. The numerous lumber tables of which the work largely consists show nearly 4000 different sizes and lengths, and the arrangement is such that the number of feet in any number of pieces can be determined almost at a glance. The same tables can be used for addition, multiplication and division, also for computing dollars and cents by use of the decimal point. Among the tables are a number for computing interest at different rates, diagrams and rules for cutting rafters, rules for finding the number of shingles and the number of feet of flooring and siding for any size of building, the number of lath and the ingredients for plaster and mortar, the manner of mixing paints, the capacity of cisterns, log scales, tables of weights and measures, brick required to construct any building with walls of varying thickness, together with a great many other handy things to know. The author states that the different features of the book can be depended upon for accuracy, as they are the work of practical and experienced men, by whom they have been thoroughly tested and proved.

Steel Mill Buildings.—By Milo S. Ketchum, C. E., Dean of the School of Applied Science and Professor of Civil Engineering, University of Colorado. Bound in cloth, 6½ x 9 inches, 367 pages, 29 tables and 185 illustrations. Published by the Engineering News Publishing Company. Price, $4.

The title of the book in full is, "The Design of Steel Mill Buildings and the Calculation of Stresses in Framed Structures." It was written primarily as a text book for the author's students, and the subject matter is concerned chiefly with mill buildings, but much of it will apply equally well to all classes of steel frame construction. The text is logically arranged, treating first of the fundamental principles, parts I and II being concerned with loads and stresses, wherein algebraic and graphic methods of calculating are fully described and illustrated, and, finally, in parts III and IV applications are covered in the design of mill buildings and miscellaneous structures. An appendix contains a very complete form for the general specifications for a steel frame mill building. As it is one of the main objects of the book to give methods, data and details not ordinarily available, much has been incorporated, particularly in the way of tables that are not to be found in the standard hand books.

Graining, Ancient and Modern. By William E. Wall. 138 pages. Size, 6½ x 9¾; 56 illustrations, many of which are in colors. Bound in boards. Published by the author. Price, $3, postpaid.

According to the author the chief object of this work is to provide instruction for those in the trade addressed, especially the younger element, who desire to become proficient in graining. The matter originally appeared as a series of articles by the author under the title "Practical Graining," in what was then known as *The House Painting and Decorating Magazine*. They were later issued in book form, but have been out of print for several years. Frequent requests for the articles induced the writer to issue the present volume, which contains added information on the subject.

The work is comprised in 47 chapters, illustrated by means of 56 plates, many of which are printed in colors in imitation of the graining effects which can be produced in connection with woods of various kinds. The early chapters are given up to a consideration of the antiquity of graining, imitations and eminent grainers of the last century. Next in order are chapters dealing with colors, after which various woods are described, together with effects which may be produced by graining. The causes of cracking in grained work are discussed in one of the later chapters, while another relates to an illustrated talk given at the second annual convention of the Master House Painters' and Decorators' Association in Canada in July, 1905, the picture showing Mr. Wall graining a door of quartered oak. The matter has been presented by a practical man, and he has handled his subject in a way which cannot fail to appeal to the ambitious young man who is desirous of making progress along the lines indicated.

New Cathedral at Los Angeles, California.

Plans have been adopted for the new Cathedral of St. Vibiana, to be erected by the Catholic Church on West Ninth street. The new building is the most ambitious effort in the direction of establishing a style of monumental architecture adapted to the climate and general characteristics of Southern California. The towers and the cloisters suggest the lines of the familiar mission type, though they are carried out on a much larger scale and in more graceful proportions than has hitherto been attempted. The main features of the design are the dome and the two towers. The former is a development of a general feature of some of the old Continental buildings. It will have a sheathing of polychrome tiling in vivid greens and reds and yellows.

From the front line of the Cathedral building to the back line is 250 feet. From end to end of the transept is 145 feet. The length of the nave will be 136 feet and the length of nave with chancel 200 feet. The width of the nave will be 48 feet and the hight of interior 64 feet. The sanctuary will be 48 x 64 feet. The full width, including cloisters, will be 198 feet. The hight of the towers from the street to the cross will be 195 feet. The hight of the dome from base to the foot of the cross will be 164 feet and to the top of the cross 176 feet. The diameter of the dome will be 80 feet and the base of voluted part 64 feet. The area of the base of the towers will be 26½ feet square. The width between towers will be 68 feet and the front width, including doors, will be 123 feet. The width of doorway will be 36 feet and the hight of front doorway will be 54 feet. The general

sacristy will be 52 x 21 feet, the bishop's sacristy will be 10 x 21 and the boys' sacristy will be 21 x 26 feet. The lady chapel will be 38 x 69 feet.

The arrangement of the building is such that the main altar is in full view from all parts of the auditorium, which will seat 1200 persons. The entrance to this is through an ornamental doorway embraced within an arch 54 feet and 36 feet wide. Provision is made in the interior for three magnificent reredoses, one back of the main altar and the others back of the altars at either end of the transept. This feature suggests somewhat of the old missions and the cathedrals of old Mexico.

Around the piers supporting the dome are spiral stairways providing a comprehensive view of the whole interior. The sanctuary is large, and there is an elaborate system of vestries. There are also smaller chapels and shrines for which an individual scheme of decoration will be carried out. The largest of these adjoins the main sanctuary on the left, and is to be 69 feet in length and 38 feet in width.

Closing Exercises of Mechanics' Trade School.

The closing exercises for the sixth term of the Massachusetts Charitable Mechanic Association Trade School were held at the Mechanics' Building, Huntington avenue, Boston, Friday evening, March 30. In spite of wet weather there was a large gathering present. Manager Wood in a few brief words introduced the speakers. Charles H. Rollins of the Smith & Anthony Company spoke on plumbing, its development and its future prospects for rising young plumbers. R. A. Woods spoke on industrial and trade schools. He said in part: "Russia, the country on which we are apt to look with regret, is the country which gave us our first insight into industrial training through an exhibit which was made by that country at the Centennial Exposition in Philadelphia in 1876. People who saw the exhibit of the Russian schools were so impressed with the idea that schools of a similar nature were started in a small way in this country. Since that time this class of schools has been growing in favor, until now we have some of the finest industrial schools in the world, although Germany is said to be ahead of us in this respect."

C. H. Morse of the Rindge Manual Training School was the final speaker, and presented the graduates with their diplomas.

At the conclusion of the exercises the visitors were invited to inspect the work of the boys for the past season. The sheet metal class, started last season, made an excellent showing and its success is assured.

Closing Exercises of the Mechanics' Institute

The closing exercises of the School Department of the General Society of Mechanics and Tradesmen of the City of New York, 16 to 24 West Forty-fourth street, were held in Carnegie Hall on the evening of Thursday, April 12, in the presence of a large gathering. After a few introductory remarks by President Niles G. White, he introduced the Rev. Donald Sage MacKay of the Fifth Avenue Reformed Church, who spoke along educational lines, pointing out that the advantages of an education were largely in its by-products, one of which he emphasized as being habits of industry. In the opinion of the speaker education was the solution of the labor question and the Mechanics' Institute was working at the root of the problem.

The address to the graduating class was delivered in most eloquent style by James H. Canfield, LL.D., who spoke at length on specialization in education, saying that the days of the all-round man had to a great extent gone by; that the man who taught the raw material was very little heard of and never reached any considerable degree of distinction, but that at the present time teachers and professional people sought to perfect themselves in special lines, thereby accomplishing a great deal more than by former methods. He pointed out that at least 95 per cent. of the pupils of the public schools did not get beyond the fifth grade, after which they became wage earners, and that the continuation of their education was accomplished by such institutions as the Mechanics' Institute.

The diplomas and certificates were then awarded the graduates by Robert Christie, Jr., chairman of the School Committee, after which the George E. Hoe prizes were awarded. The prize in architectural drawing, in which class were 27 graduates, was secured by Clinton DeWitt Everett; that in mechanical drawing, in which class were 19 graduates, was awarded Anthony Frisa; that in free hand drawing, in which class were four graduates, was given to Dimitri Romanoffski, and the prize in clay modeling to John McInerney.

An interesting feature of the exercises was the rendering on the large organ of various numbers of selected music, and at the conclusion the organist played "America," the audience rising and singing the National Anthem.

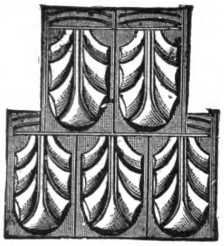
An exhibition of the work of the pupils in the various classes occurred on Wednesday evening, April 11, in the rooms of the Institute in West Forty-fourth street. There was a good display of architectural work by the graduating class, and it included designs of apartment and country houses, which were highly creditable to both students and teachers. The modeling class in architectural ornamentation also made an exceptionally fine showing.

CONTENTS.

Editorial— PAGE.

Correspondence—

Novelties—



THE HANDSOMEST METAL SHINGLE IN AMERICA

A Sample will prove this. It makes good agents money

NEW CENTURY
PAINTED TIN
GALVANIZED
COPPER : : : :

MANUFACTURED SOLELY BY

The Chattanooga Roofing & Foundry Co.,

CHATTANOOGA, TENN., U. S. A.

TO get a right start in the study of heating systems take up

THE STEAM
AND
HOT WATER
FITTERS'
TEXT-BOOK

By THOMAS E. McNEILL

Qualifies the student with a grasp of the different systems, their installation and fitting under approved conditions.

Gives simply presented information, arranged principally in a series of leading questions with clear and comprehensive answers.

146 Pages; Numerous Illustrations and Diagrams.

ONE DOLLAR, POSTPAID

DAVID WILLIAMS CO.
Publishers,
14-16 Park Place, N. Y.

IMPORTANT.

A British firm, with extensive Joinery Department, fully equipped with modern Woodworking Machinery, is open to negotiate for manufacture and sale of high class Joinery, Cabinet Making, or Furniture specialties of any kind, either for British Market or for exportation. If desired, such arrangement will be made at present as will cover the eventuality of a tariff being imposed on manufactured imports sent into Britain.

Representatives in the principal towns in the United Kingdom.

For fuller particulars apply to JOINERY, care of

H. P. LANCASTER, Esq., Caxton House, London, S. W., England

THE NEW
THIRD EDITION OF
KIDDER'S
Churches and Chapels
IS AN EXCEPTIONAL BOOK.

THIS edition is thoroughly revised and is enlarged to contain many new designs, including several for Catholic churches. There are 120 illustrations in the text and more than **50 full-page plates.** The book contains a large number of plans and perspectives of churches of varying costs. Besides this there is much concise and practical information relating to planning and seating; details of Construction, Heating and Ventilation, Acoustics, etc.

Oblong Quarto Volume, Cloth.
Price, $3.00, prepaid.

DAVID WILLIAMS COMPANY,
14-16 PARK PLACE, - - - - - - - - - - - - NEW YORK

Carpentry and Building
WITH WHICH IS INCORPORATED
The Builders' Exchange

PUBLISHED MONTHLY

To all parts United States, British America and Mexico, - $1.00 Per Year
To all other Countries, - - - - - - - - 1.25 Per Year
Advertising Rates on Application.

BUSINESS OFFICES.

NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHERS....................14-16 Park Place.
PHILADELPHIA—S. S. RECKEFUS, Manager..Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—WALTER C. ENGLISH, Manager....................Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, Manager....................Park Building, 357 Fifth Avenue.
CHICAGO—A. A. AINSWORTH, Manager....................Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—HENRY SMITH, Manager....................Pickering Building, Fifth and Main Streets.
CLEVELAND—EZRA S. ADAMS, Manager....................The Cuyahoga, 311 Superior Street.

ENTERED AT THE POST OFFICE, NEW YORK, AS SECOND-CLASS MATTER.

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from
UNIVERSITY OF MICHIGAN

NOVELTIES.

The Butler Hip Shingle.

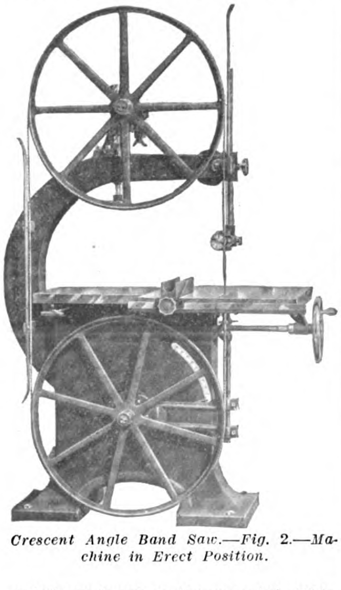
The Butler Mfg. Company, Station A, Kansas City., Mo., has recently placed on the market a metal hip shingle of the pattern illustrated in Fig. 1 of the cuts. This shingle is furnished in either galvanized iron or painted tin, as desired. With the use of such shingles the hip roof is made leak proof and the appearance of the building is improved. The cost is but little more than that of wood shingles, but the metal shingles have the distinct advantage of long life, so that they eventually prove cheaper.

Novelties.—Fig. 1.—The Butler Hip Shingle.

Although the Butler hip shingle has been known to the trade for a comparatively short time it has been found to meet the popular fancy, and the demand is showing rapid growth.

The Crescent Angle Band Saw

A band saw embodying a number of interesting features, among the more important of which may be mentioned a level table with tilting saw, has just been brought out by the Crescent Machine Company, Leetonia, Ohio, and is shown erect for square sawing in Fig. 2, and in a tilted position in Fig. 3, of the illustrations. The company does not set up the claim to have originated the idea of making a level table band saw with tilting saw, but they do claim to have worked out the idea in a new way that is thoroughly practical. All the parts work automatically, so that no adjustments are necessary in changing the angle of the saw. The entire operation is accomplished by simply turning a hand wheel at the side of the table until the pointer indicates the desired angle on the graduated quadrant on the pedestal. This, it is stated, may readily be done while the saw is in motion. The table is carried back on the pedestal in exact unison with the saw, so that the latter maintains its proper position in the saw slot. There are no complicated devices to get out of order, and the manufacturer states that it is owing to its simplicity that the machine can be sold at a much lower price than is usually charged for machines of this class. The arm is hinged to the pedestal in a most rigid manner by means of a heavy trunnion passing through them, concentric with the lower shaft, so that the machine is as rigid when tilted as when standing erect. The bearings for the lower shaft consist of solid bushings fastened into the trunnion, and are practically self oiling and dust proof. The upper bearing is made with revolving shaft running in adjustable bearings the same as the company's regular band saws. The table slides on planed ways of the pedestal and is provided with a steel gib for taking up possible wear. The saw will tilt back to an angle of 45 degrees, and may tilt forward to 4 degrees beyond the perpendicular. A stop is provided on the perpendicular point so that the latter may easily be reached without referring to the graduated quadrant, but this stop can instantly be swung out of place, thus allowing the saw to pass on to any tilt desired. The claim is made that the machine has all the good qualities of the company's regular style of band saws, such as spring tension, counterbalanced guide bar, hollow cored-out frame, universal adjustments to upper wheel, &c. The tight and loose pulley is 16 inches in diameter, with 4-inch face, and should make 400 to 450 revolutions per minute. The table, which is of iron, measures 28 x 34 inches and is 41 inches from the floor. The floor space occupied by the machine when erect is 40 x 63 inches, and the hight over all is 95 inches. The band wheels are 36 inches in diameter, with 2-inch face, and the clear distance between saw and arm is 36 inches. The clear hight under the guide when raised is 18 inches. The statement is made that the special features of the machine have been patented.



Crescent Angle Band Saw.—Fig. 2.—Machine in Erect Position.

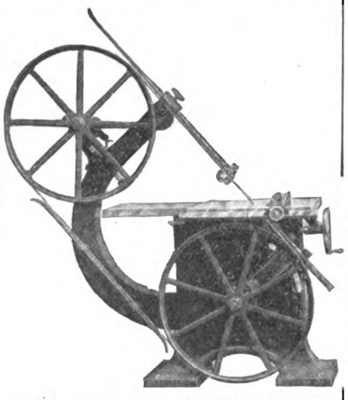


Fig. 3.—View of Saw in Tilted Position.

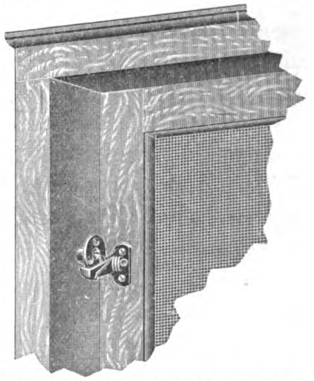
The Little Giant Floor Scraper.

The floor scraper shown in Fig. 4 of the accompanying illustrations is designed for surfacing hard wood floors, and it is claimed can be successfully used on oak, maple, birch, yellow pine, beach and parquet floors. The knife being attached to the front of the frame of the machine, enables the operator to get in all corners and up to the baseboard, thus obviating the surfacing of any part of the floor by hand. The machine consists of a solid steel roller, with a shaft running through its center, upon which is supported a cast steel frame. The bearings are of bronze, and two springs on either side interposed between them and the frame enable the operator to tilt the knife to either side without the necessity of tilting the entire machine. The knife, which is slightly convex, thus preventing the scratching of floors with its corners, is bolted to the front of the frame and is adjustable, and when the machine is in position is raised ⅛ of an inch from the floor. Two small wheels adjusted to the frame in the rear of the roller serve as a balance for the former. The handle is likewise adjustable and can be shortened for use in small rooms, where it would be inconvenient to operate with the handle at its full length. The small balance wheels, as well as the roller, have rubber tires, offering ample protection to the floors. This machine is manufactured by the Hurley Machine Company, 153-159 South Jefferson street, Chicago, and an Eastern office has recently been opened at 1010 Flatiron Building, New York City.

Fig. 4.—Little Giant Floor Scraper.

Ideal Automatic Door Catch.

The Ideal automatic door catch which we illustrate in Figs. 5 and 6 of the engravings, is being placed on the market by Schofield & Co., Freeport, Ill. The wheel, which is bolted to the casing, as shown in the pictures, revolves on the bolt which holds it when it comes in contact with the latch, thus preventing any friction. A greater or less degree of tension is secured in the action of the catch by adjustment of the latch or the wheel in their relation to each other. The spring of the latch is not adjustable. Fig. 6 shows the application of the latch to cupboard doors.

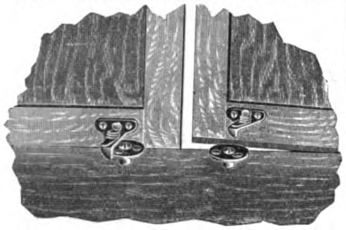


Ideal Automatic Door Catch.—Fig. 5.—Showing Manner of Application.

Wigwam Portable Houses.

Those of our readers who are contemplating a neat little cottage at the seashore, the lakeside, the mountains or the hunting grounds, cannot fail to be interested in a daintily printed catalogue which has been issued by

E. F. Hodgson, Dover, Mass., and which illustrates and describes some of the many styles of portable houses which he is prepared to furnish. The illustrations are half-tone reproductions from photographs of the buildings after they have been erected in various parts of the country, and are accompanied by descriptive particulars and testimonial letters which are of special interest in this connection. The cottages illustrated include both small and large sizes, some of them being in use at various points throughout the New England States. Some of the buildings are used as summer houses, others as garages, gardeners' houses, &c. In the catalogue before us are given specifications for the buildings, with figures of cost, suggestions as to planning, and what it costs to transport a wigwam portable house from Dover, Mass., to points north, south and west. The entire matter is presented in a most interesting style and constitutes information which will be appreciated by all contemplating a summer home of their own at the seaside or in the mountains.


Novelties.—Fig. 6.—Ideal Catch Applied to Cupboard Doors.

Wagner's Sliding Barn Door Latch

We present in Fig. 7 of the accompanying illustrations, a view showing the application of what is known as the Wagner No. 35 Sliding Barn Door Latch, which is being introduced to the trade by the Wagner Mfg. Company, Cadar Falls, Iowa. The handle and latch are made of one piece of 7-16 inch round steel, and the catch is flush so that nothing projects to interfere with fly nets or harness while the horse is passing through the door. The handle and latch are obviously the two important parts of the device, and the construction is such as to give great strength. By the use of the Everlasting spring a free, easy automatic action is secured. In closing the door it is only necessary to give it a slight push and the latch catches every time.

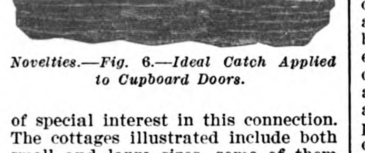


Fig. 7.—Wagner's Sliding Barn Door Latch.

The Wager Timber Scale.

A rather ingenious slide rule for computing the strength of beams and which may be used independent of any separate tables or formulæ has recently been placed upon the market by the John Howard Herrick Company, Baltimore, Md. The scale measures 9¼ inches in length by 3⅝ inches in width, and is made of heavy cardboard, to which is secured two strips capable of sliding across the surface of the larger and supporting piece. These bear suitable scales, and by the adjustment of the loose strips to the several scales in question various computations may be worked out with comparative ease and dispatch. By the proper manipulation of the scales the proper size of joists or beams to carry any safe load per square foot from 40 to 500 pounds may be indicated, using any combination of span, spacing or kind of wood. The claim is made that the Wager scale contains more information than could be given in several hundred pages of tables, and being based on the principle of the engineer's slide rule it can readily be demonstrated that it is simplicity itself. The point is made that contractors and builders save the price of it on every piece of timber they have to order, as the tendency is always to err on the side of safety and to use timbers which are heavier than necessary, whereas by referring to the Wager scale the exact size required is immediately determined. As a working tool for an architect or builder it is invaluable, as when once understood it can be employed in determining a great number of questions which are constantly coming up in every day practice. In regard to the use of the tool, the manufacturer points out that the following factors enter into every problem dealing with the carrying capacity per square foot of a floor or roof system constructed of wood; namely, width of timber, depth of timber, spacing—that is, the distance from center to center of joist or girders—the span; the kind of wood; the fiber stress, and the safe load in pounds per square foot. If any four of these factors are known or decided upon the unknown factors are immediately determinable. When it is necessary to determine the total safe load that a given timber will sustain the answer is as quickly found as in any of the other problems, the size of timber, span, kind of wood, or method of loading not affecting the ease or celerity with which any problem may be solved. Similarly, the size of timber may be found which will be required to carry a given load on any given span applied in various ways. The scale also gives the maximum span for any depth of timber and for any manner of a dozen kinds of wood, to avoid excessive deflection. The fiber stresses for the different woods are given according to the latest researches and tests made by the United States Government, those allowed by law in various cities being added. Factors for "moisture contents" are also given, which enable the designer, should he so desire, to cut down the size of his carrying members to the lowest possible point. The same company is making the Merritt beam scale for computing the strength of steel beams, this, too, being based on the principle of the engineer's slide rule, and was designed to simplify computations of this kind and to eliminate all chance of errors. There are two sets of scales embodied in this device, the first being used when it is desired to design a system of floor beams or girders which are to support a safe load in pounds per square foot over the entire floor area, while the second system is used when it is desired to determine the carrying capacity of a single beam loaded in various ways and supported in various manners. Accompanying the scales the company furnishes a little pamphlet giving full and explicit directions regarding their use. These scales are being offered at $1 each.

Dunn's Cement Brick and Stone Machine.

The Fred W. Dunn Company, 1486 North Rockwell street, Chicago, Ill., is bringing to the attention of the trade a new brick and stone machine which is referred to as being simple and durable in construction, rapid in operation and having a capacity for turning out 50 bricks at a time. The frame is made of steel angle bars, and all working parts are of polished cold rolled steel. The joints are properly fitted, the machine is rigid and there are no complicated parts to get out of order. The claim is made that sills and window caps can be made 6 feet long or less and of any width by simply moving the angle bars to the size desired, also coping stone, water tables, veneer stone, &c., of any length, width or thickness can be turned out, as can blocks from any width to 1 inch in length to 6 feet for building one or two-piece walls. In addition, the machine will turn out hollow blocks, angle blocks and fence posts in a rapid and satisfactory manner. The construction is referred to as a combination affair, in that it consists of ten machines in one. The statement is made that by sliding the dividing knives backward and forward a trowel face can be produced on the brick, and in making all kinds of stone one can use a wetter mixture of concrete. In Fig. 8 of the illustrations is shown a general view of the machine, which is offered under the name Victor.


Fig. 8.—Dunn's Cement Brick and Stone Machine.

Hight's Union Combination Square

A tool which is of special interest to carpenters and builders and one for which a patent is now pending is the combination square shown in Fig. 9 of the engravings, and which is being introduced to the trade by A. W. Hight, Box 17, Toledo, Ohio. The device is referred to as the best tool of its kind on the market, and all its combinations are available at the same time. The notches in the edge of the slot in the blade are ⅛ inch apart and are for the purpose of enabling the tool to be conveniently used as a gauge. In order to use the bevel protractor it is only necessary to loosen the clamping bolt, draw out the

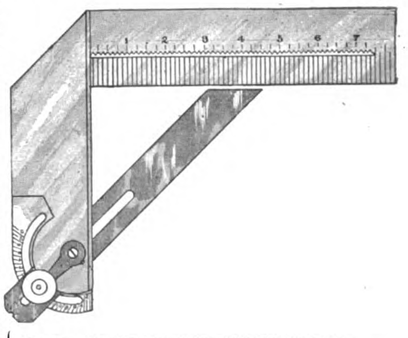


Fig. 9.—Hight's Union Combination Square.

protractor to the angle required and clamp it in place. The protractor is set by the scale marked on the circular segment clearly indicated in the cut. This scale is marked to indicate the angle expressed in inches rise for 12-inch base, when set on the figure 6 in the first series. The angle is one which will give the rise of 6 inches in 12, or the angle for the bottom of the rafter for one-fourth pitch. In order to obtain the angle for the top of the rafter for the same pitch it is only necessary to set on the 6 in the second series. The first series is from 1 to 12 and the second from 12 to 1. The third series is intended for use when it is not convenient to turn the tool over in order to obtain the reverse angle. The circular segment is laid off in degrees on the lower side which will readily show the figures on a square with 12 required to cut any desired number of degrees. The notch in the end of the protractor enables it to be used for a gauge in corners, gauging for setting hinges and beveling edges, &c. The tool, as sent out, is nickel plated and will be found a very desirable addition to a carpenter's kit.

Catalogue of Schaller-Hoerr Company.

Architects and builders all over the country will be interested in an attractive catalogue of 192 pages relating to a varied assortment of millwork and builders' material, which has just been issued from the press by the Schaller-Hoerr Company, Chicago, Ill. It is referred to as "A silent salesman from a manufacturer of millwork," and the matter presented within its covers is so arranged as to be of great convenience for those having occasion to use sash, doors, interior finish, mantels, grills, porch and stair work, hardwood flooring, &c. The company states that it is operating in Chicago a large factory equipped with modern machinery, especially designed for getting out millwork material of all kinds. This it is claimed puts the company in a position to serve its customers on special work to the best advantage. Among the early pages of the catalogue are directions for ordering goods, together with a statement of terms. The illustrations are numerous, and in connection with them are prices, numbers and sizes. An interesting feature is tables giving the approximate weights of open and glazed sash, doors, blinds, &c., as well as rates of freight from Chicago to leading cities of the country. An index alphabetically arranged greatly facilitates reference.

TRADE NOTES.

The "Little Giant" Floor Scraper is the subject of the page advertisement of the Hurley Machine Company, Chicago, Ill., and with New York office at 1010 Flatiron Building, Broadway and Twenty-third street. The merits of the device are briefly enumerated and the old and the new way of scraping floors are illustrated. The device itself is described this month among our "Novelties."

Rehm Hardware Company, 354 Blue Island avenue, Chicago, Ill., is offering to send free a copy of its new illustrated catalogue and price-list showing the latest designs and finishes in builders' hardware, with over 1000 illustrations and 40 different designs in 15 different finishes. This catalogue with net prices will be sent to contractors and material men upon request.

F. W. Dunn Company, 1486 North Rockwell street, Chicago, Ill., calls attention in its advertising card this month to the Dunn gravity mixer, for which patents are pending. In view of the extent to which concrete is being used at the present time in building construction this device is of unusual interest to contractors and builders all over the country.

The Batavia Clamp Company, Batavia, N. Y., is distributing among the trade a neat little pamphlet calling attention to the merits of Colt's series of quick acting clamps, which are adapted to meet a variety of requirements. In the construction of these clamps the eccentric lever is used by means of which pressure is applied "instantly, directly and efficiently," thus avoiding the liability of displacing the work occasioned by turning a slow working screw. Special attention is invited to the improved movable jaw with its double grip on the bar, also to the new Universal clamp and the U-bar clamp, which is smooth, light and strong. The various styles of clamp are illustrated and described in a way to be of special interest to the carpenter, builder, cabinet maker and in fact all having occasion to make use of a device of this nature.

Charles F. Lorenzen & Co., 247 North Ashland avenue, Chicago, show in their page advertisement this month what they are doing for the building contractor. There are reproductions of some of the company's magazine advertising the present season, special attention being drawn to its "attractiveness and high class character." An offer is made concerning Lorenzen mantels in which contractors cannot fail to be interested. The statement is made that 50 Lorenzen mantels were recently selected by the United States Government and shipped to Pekin for use in the new legation buildings. Those of our readers who are interested in mantels, grills and fireplaces can obtain on application a copy of a 100-page catalogue which affords an excellent idea of the variety of work turned out by this concern.

"The Honeywell Heat Generator" is the subject of a daintily printed pamphlet of a size convenient to carry in the pocket which is being sent out by the Honeywell Heating Specialty Company, Wabash, Ind. The generator is a device designed to be connected to the expansion pipe of a hot water heating system for the purpose of controlling the expansion of the water in it. The claim is made that it will stimulate and increase the circulation of the water to such an extent that the piping can be greatly reduced, and that it operates by mercury similar to the gas testing gauge, only that the generator is so constructed that there is a positive internal circulation of the mercury as long as the water is expanding. Of the many advantages claimed for the use of this device may be mentioned rapid circulation, quick results from firing, wide range of temperatures, low cost of installation, a minimum amount of water in circulation, and above all else a great saving in labor.

We have before us a copy of the April issue of the *Cortright Metal Shingle Advocate*, published by the Cortright Metal Roofing Company, Philadelphia, Pa. The leading article deals with "The Tight Roof," and a definition of what constitutes such a roof is given as one covered with Cortright metal roofing. The article concludes with the statement that the company wants to help every local representative to spread the fame of this roofing and invites dealers to write for suggestions calculated to assist in the development of the business. In addition to trade matters there is more or less of what might be regarded as "light" reading and for the most part of a humorous character. The illustrations are half-tone reproductions from photographs of dwellings which have been roofed with Cortright metal slates.

The Grinnell Publishing Company, 361 and 363 Washington street, Buffalo, N. Y., calls attention in our advertising pages this month to a little work of special interest to contractors, masons, bricklayers, cement workers, carpenters, painters, lumber dealers and prospective builders. It is entitled "Grinnell's Estimator and Builders' Pocket Companion," and in preparing it the author has endeavored to produce a reference book adapted to the wants of contractors and mechanics in all the leading branches of the building trades. Prominent among the matter presented are tables for estimating plastering, brick work and cement work; estimating a building by the superficial foot, rafter tables, instructions for framing and putting up hip roofs, &c. There is also a cement block table giving the size and weight of blocks and the number which a yard of concrete will make, as well as the number per square. The matter is arranged in convenient form for reference, and the little work is of such a size as to be readily carried in the vest pocket.

The Yale & Towne Mfg. Company, 9 Murray street, New York City, presents in its advertising space this month some very interesting comments on the subject of locks. The point is made that locks are of three types—warded, lever tumbler and pin tumbler. Reference is made to each of these types of locks, pointing out their characteristics, and in conclusion calling attention to the company's No. 18 catalogue, which contains much information of interest to carpenters and builders. A copy of it will be sent to any address on request.

We have received from the Merchant & Evans Company, successor to Merchant & Co., Philadelphia, Pa., a copy of a perpetual calendar which is indexed for 180 years running from 1776 to 1955. The covers of the calendar, which is in the form of a neat little pamphlet of a size convenient to carry in the pocket, call attention to Merchant's Old Method roofing plates, the Star ventilator and leading lines of metals and specialties handled by this concern.

The Chattanooga Roofing & Foundry Company, Chattanooga, Tenn., calls special attention to its New Century metal shingle and states that in order to produce a perfect galvanized shingle it has its own galvanizing plant and applies the coating after the shingle has been formed. In this way the claim is made there is insured a perfect coat without crack or scale. The company reports the demand for galvanized, cast and wrought iron building material as far beyond what it was a year ago at this time, this being particularly true of the company's Nooga line of skylights and awnings. Architects and builders as well as others interested can secure a copy of the company's illustrated catalogue by making application.

The Kinnear & Gager Company, Columbus, Ohio, calls attention in its advertising space this month to the Kinnear lock joint steel ceilings, which have achieved a wide popularity in the trade and which are of special interest to architects and builders everywhere.

Carpenters and builders generally throughout the country will be interested in the announcement presented in another part of this issue by the Hood Furnace & Supply Company, Corning, N. Y., relating as it does to what is known as "The Hood Lumber Ready Reckoner." This work, reviewed at some length in these columns a short time ago, contains a series of tables relating to the quantity of material in all sizes and lengths of studding, joist and timber, from one piece to 100 pieces, and then in 125, 150, 175 and so on to 300 pieces of each size. It is stated that there are more than 15,000 separate calculations and nearly as many more of odd sizes. There are tables giving the number of feet in all sizes of casing and base finishing lumber and small sizes of high priced piece stuff, the Doyle and Scribner log rule, a table on wages, another of cistern capacity, a few guides and estimates on brick and stone work, plastering, shingling, flooring, &c. The size of the book is 4¼ x 7 inches, and contains 58 pages. The book is sent out as an advertisement of the Hood warm air furnace and will be sent to any address on receipt of 50 cents, postage paid.

The Albert W. Miller Mfg. Company, Cincinnati, Ohio, and Riverside, Cal., calls attention in its advertisement this month to Miller's hand mortiser for mortising doors and locks. The time per door is stated to be three minutes. The terms on which the device is sold cannot fail to interest carpenters and builders generally.

The very great demand for back numbers of *Carpentry and Building* has rapidly exhausted the editions from time to time, and many of our readers have been unable to secure copies which were missing from their files. One reader, however, has adopted the expedient of advertising for complete volumes of certain years in order to render his library complete, and in another part of this issue a request is made for complete files of *Carpentry and Building* for 1896, 1898, 1900, 1901, 1902, 1903, 1904 and 1905. Those who have such files and are willing to dispose of them should address Box 473, Westfield, N. J.

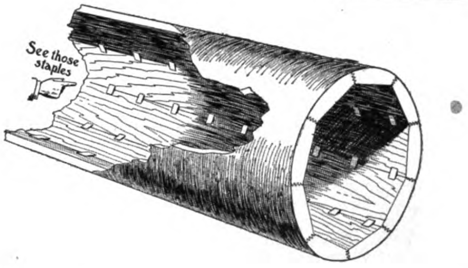
In another part of this issue will be found an announcement relating to a British firm with extensive joinery department and fully equipped with modern wood working machinery which is open to negotiate for the manufacture and sale of high class joinery, cabinet making or furniture specials of any kind, either for the British market or for exportation. Full particulars regarding the matter can be obtained by addressing "Joinery," care H. P. Lancaster, Caxton House, London, S. W., England.

Bradt Publishing Company, 260 Michigan avenue, Jackson, Mich., calls the attention of carpenters to the facts that the second edition of "The Lightning Estimator" has been exhausted and that the third edition, greatly improved and considerably larger, is now ready for distribution and copies can be obtained at 60 cents each. The matter has been prepared by a prominent builder and is said to be based on records of actual construction.

THE ONLY PERFECT AND RELIABLE LOCK JOINT COLUMN MADE

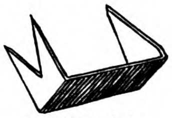
WRITE TO-DAY

PATENTS
PENDING



Columns are glued up under enormous pressure and then the staples are driven in as shown in illustration by our special machinery.

FREE OFFER On Receipt of Postal saying where you saw this Adv. we will send you postage paid a Sample Section of this Column showing the wonderful Lock Joint.



Cut of Staple is three quarter size.

THEY CANNOT OPEN AT THE JOINTS

Put them where you will, in the hottest room, the driest or dampest climate, they POSITIVELY WILL NOT OPEN. WE GUARANTEE IT.

Made only by

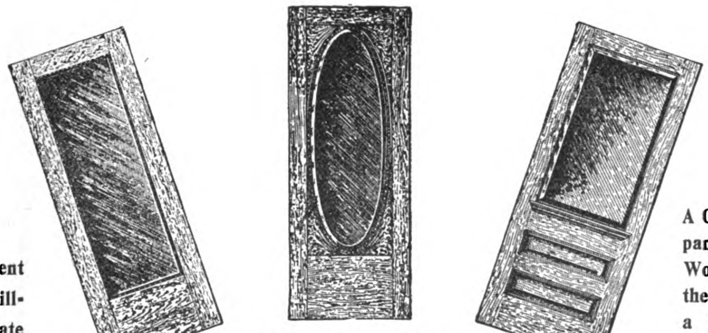
AMERICAN COLUMN COMPANY, BATTLE CREEK, MICH.

DON'T TAKE SUBSTITUTES.

Our Line Of

Hardwood Veneered Front Doors

A large assortment of all kinds of Mill-work for immediate delivery



Send for colored illustrations, showing these doors in Quartered White Oak with net prices

A Guarantee accompanies every order. Workmanship is of the highest grade, as a trial order will convince

Carpenters and Builders

This is a picture of Our 200 Page Catalogue, just off the press, and ready to mail upon request, WITHOUT CHARGE

6 x 9 Inches. Over 700 Illustrations.

Schaller-Hoerr Company

416-426 Blue Island Ave., Chicago, Ill.

What Lorenzen is Doing for You, Mr. Contractor - Builder

These illustrations represent some of our expensive magazine advertising this season.

LORENZEN MANTELS

The Chateau Blois One of Our 125 Exclusive Designs

LORENZEN

From $10.00 Up

LORENZEN MANTELS

Let's Figure It Out

LORENZEN MANTELS

You will notice its attractiveness and high class character. It is a guarantee to people of refinement that Lorenzen Mantels are of superior quality.

Hundreds of thousands of readers are already familiar with our products and the constant repetition of the name "Lorenzen" from month to month means inquiries to contractors, builders, architects and dealers in general.

Now, if you will become the sales-agent for

Lorenzen Mantels

we will throw all our efforts your way to aid you in making sales.

Besides that, we have a plan for protecting you, no matter who receives our catalogue, or what prices we quote to inquirers.

This is something no other mantel house in the United States will do, and if you wish to learn more about it, write us *now* for full particulars.

This is well worth investigating.

Lorenzen Mantels have a reputation that in itself is valuable, and when we tell you what our plan for your protection is, you will certainly agree with us that it pays to handle Lorenzen Mantels.

Write us today on your business letterhead, and we will tell you how our dealers make money selling Lorenzen Mantels.

Fifty Lorenzen Mantels recently selected by the U. S. Government and shipped to Pekin, China, to be used in the new Legation Buildings, evinces the merit of the Lorenzen product.

Ask for our big 100 page catalogue, a most beautifully illustrated book of Mantels, Grilles and Fireplaces. Sent Free.

LORENZEN ·MANTELS·

The Lorenzen Mantel $10 up

LORENZEN MANTELS

Lorenzen Mantels $10 to $250

LORENZEN MANTELS

Lorenzen Mantels

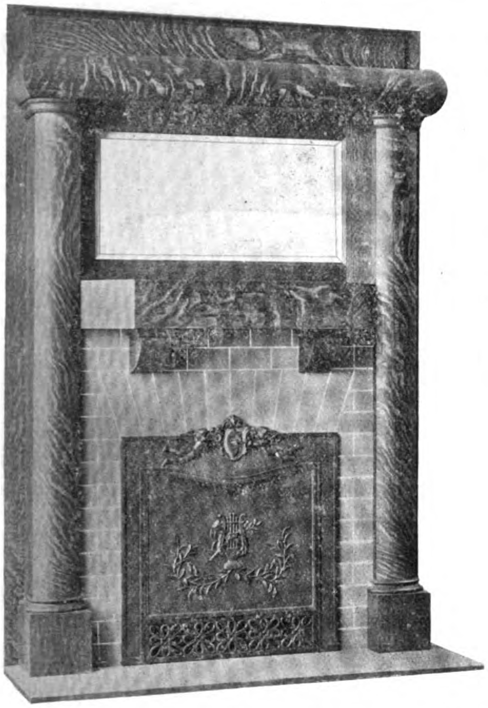
LORENZEN MANTELS

Lorenzen Mantels $10 to $250

Send for Our Catalogue

CHAS. F. LORENZEN & CO., Inc.,

247 N. Ashland Avenue, - - - Chicago



If It's a Question of $ $ $

We Can Answer It.

Our Splendid Line of MANTELS, Ranging in Price from $5.00 to $200
Will Make it an Easy Matter to Find

The RIGHT MANTEL at the RIGHT PRICE

Visit Our Show Rooms.
See the Goods.

Or else write TO-DAY for our Catalogue. It's FREE.

The A. W. Burritt Co., **400 Knowlton St.,**
"The Mantel Folks," **Bridgeport, Conn.**

For Finishing or Refinishing Floors, Woodwork and Furniture

You should use Johnson's Prepared Wax, if you want the best results. This wax has been on the market for years. It has stood the most severe test and is now known as the "World's Standard." Johnson's Prepared Wax produces a beautiful artistic finish to which dust and dirt will not adhere. It does not crack or peel off. Heel marks or scratches will not show. Johnson's Wax contains more polishing wax to the pound than any other. That's why it covers the most surface, gives the best, most lasting and elegant finish with least effort. Try it and you will be convinced of its superiority.

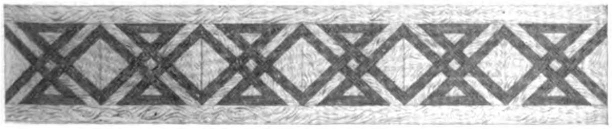
USE JOHNSON'S PREPARED WAX

"A Complete Finish and Polish for all Wood"

It comes in paste form, is applied with cloth and polished with Johnson's Weighted Brush or Johnson's Polishing Mitt. Sold by all dealers in paint—½ lb. cans, 30 cents each, 1 and 2 lb. cans, 60 cents per pound; 4, 5, and 8 lb. cans, 50 cents per pound.

Johnson's Hardwood Floors

We are large manufacturers of ornamental hardwood floors and will be pleased to send you upon request our free catalogue, showing many beautiful and new designs. Hardwood floors are far ahead of other floors—they are sanitary, durable, attractive and in demand. Don't delay—write us to-day. We carry a large stock and can ship promptly, anywhere.



Ask for book, "The Proper Treatment for Floors, Furniture and Woodwork." Tells all about wood-finishing. It's FREE. Mention edition C B 2.

S. C. JOHNSON & SON, - - Racine, Wis.

"The Wood-Finishing Authorities

Wood Carvings

Hand and Machine Carvings, Mouldings, Festoons, Newel Posts Head Blocks, Rope and Twist Balusters and Ornaments. We also make a specialty of Fine Staved Up Quartered Oak and Birch Columns for Interior Work.

Almost 1,500 designs illustrated in our New Catalogue and Price-List No. 20. Mailed for 15c. in stamps.

Waddell Mfg. Co.,

Corner Taylor and Coldbrook Sts.,
GRAND RAPIDS, MICH., U. S. A.

No. 0575.

Going to Build?

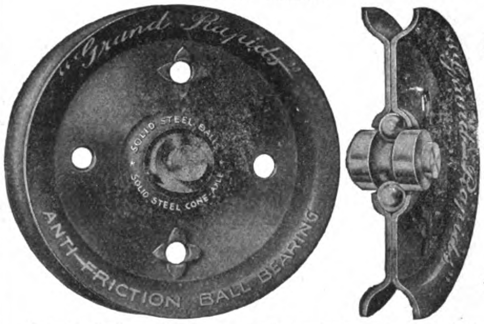
OUR CATALOGUE #25 WITH PLANS AND PLATES TELLS YOU ALL ABOUT IT, 800 PAGES, 6000 DESIGNS.

SEND 20¢ **FREE** FOR POSTAGE

THE FOSTER-MUNGER CO., CHICAGO, U-S-A

HARDWOOD VENEERED DOORS, ART GLASS, BLINDS, COLONIAL COLUMNS, PORCH WORK, SASH, ETC.

Patent Pending.



"Ball-Bearing" Grand Rapids All-Steel Sash Pulleys

Are sold DIRECT to
BUILDERS,
CONTRACTORS
and MILLS,

At prices under the common ordinary goods.

If you make ten or ten thousand window frames, we can save you money and give you a superio sash pulley. We are the largest sash-pulley makers in the world. We ship direct, or through dealer and jobbers everywhere.

Write for catalogue and free samples and prices on half-gross, gross, barrel or any quantity.

Direct from the Makers to you. Inquiries welcome.

GRAND RAPIDS HARDWARE CO.,

3 PEARL STREET, - - - GRAND RAPIDS, MICH.

Copper Cable Chain

THOMAS MORTON,

169 Elm Street, New York.

Copper Cable, Champion Metal,
Steel Cable, Steel Champion,

SASH CHAINS.

CHAINS

For Suspending Heavy Doors, Gates, etc.
All of SUPERIOR QUALITY.

Champion Metal Chain

KING MANTELS

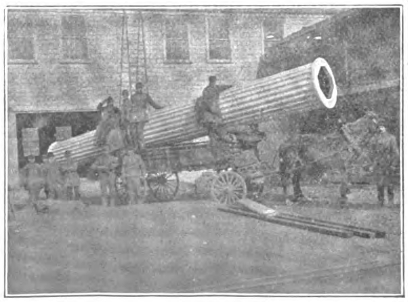
Are strictly high grade mantels at the price of medium. A hackneyed statement, but true in this case, and possible because we are located in the heart of the hardwood country, with labor conditions much in our favor. All intermediate profits are eliminated. you are dealing with the manufacturer direct.

Our little book, "Evidence," is proof, and will be sent free if you will state number of mantels wanted.

Our elegant 72 page catalogue (11 by 14 inches) of mantels, grates, tiles, etc., is the most complete book of its kind ever issued. This and our copyrighted supplement entitled "Colonial Beauties" both sent on receipt of 12 cents to pay actual postage

KING MANTEL COMPANY
652 Gay St., Knoxville, Tenn.

THE LARGEST LOCK JOINT COLUM EVER BUILT.



40½" in diameter, 33-10 in. long.

One of four furnished by us for the Portico of the Allenhurst Club, Allenhurst, N. J.

HARTMANN BROS. MFG. CO.
Mt. Vernon, N. Y., U. S. A.
New York Office: 1123 Broadway.
Also
Henry Sanders Co., Chicago, Ill.
A. J. Koll Planing Mill Co., Los Angeles, Cal.

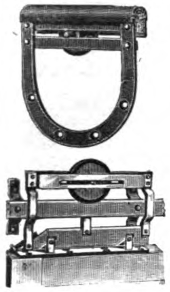
MANUFACTURERS OF

KOLL'S PATENT LOCK JOINT COLUMNS FOR PERGOLAS. **PORCHES OR INTERIOR USE.** **Send for Catalogue D 19**

Easy Lessons in Roof Measurements. Twelve Short Lessons on Figuring from Architects' Drawings the Amount of Material Required to Cover a Given Surface in Flat, Hipped or Irregular Shaped Roofs. 31 pages, 12 illustrations .... .25

For sale by David Williams Co., 14-16 Park Place, N.Y.

— Antiques.—Mr. Cribbs: "Mrs. C., I have borne with resignation—nay, even cheerfulness—antique chairs that wobbled, antique clocks that were always 13 hours behind time, antique rugs that some prehistoric Turk wove, antique china, antique bowls, pans and kettles. All this I have smiled at; but when you give me antique eggs for breakfast I draw the line, madame—I draw the line."—*Tit-Bits.*



Lane Barn Door Hangers

Give best satisfaction. We are the originators and largest makers of U-shape hangers.

"LANE'S STANDARD"

is the original steel single rail . . PARLOR DOOR HANGER

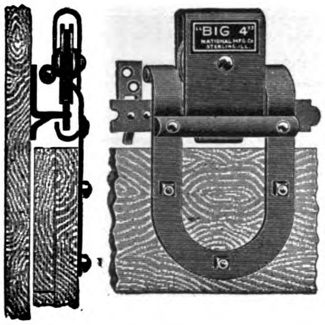
The most popular hanger to-day—because it is *all* steel and substantially and well built on correct mechanical principles.

——IT GIVES SATISFACTION.——

Sold by Hardware Trade. Send for circulars to

LANE BROTHERS CO.,

423-455 Prospect St., - - - - POUGHKEEPSIE, N. Y.



"BIG 4"

FLEXIBLE DOOR HANGER.

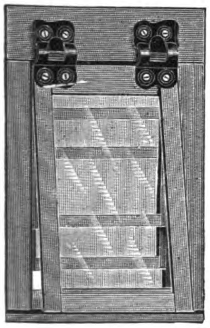
Anti-Friction. Cannot Jump the Track.
Exclusive Sale Given.

NATIONAL MFG. CO.,
STERLING, ILL.

Grand Rapids Wood Carving Co.,

GRAND RAPIDS, MICH.

Catalogue on application.



Full-length window screens keep out all the flies and protect the windows. Screens attached with

GOSSETT'S
Detachable Suspension
HINGES

are easily put up or removed—no tools or ladder necessary. Write for free sample pair. Price per Doz. pairs $1.20 (Express paid),

Sold by Hardware and Lumber Dealers.

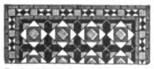
Manufactured by

F. D. KEES MFG. CO. Beatrice, Nebr.

GRILLES "Direct from Factory" MANTELS

No. 225—48x12 inches, **$3.60.** Retail value, $7.00.
No. 230—48x14 inches, with Curtain Pole, **$4.50.** Retail value, $9.00.

Others from $2.50 up. Largest assortment. Division Screens and special Grilles to order.



Tile and Mosaics
for everywhere.
Walls, Floors, etc.

$13.25 buys this solid oak Mantel, 80 in. high, 54 or 60 inches wide, 28 x 16 Mirror. Heavy columns and elaborate capitals. Tile facing and hearth with Plated Frame and Club House Grate, $10. extra.

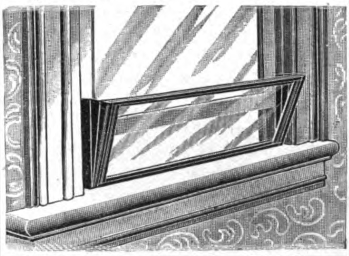
HARDWOOD FLOORS

will last as long as the house. Any carpenter can lay it easier than ordinary flooring. Get our prices.

Write for catalog of Mantels, Grates, Tiles for floors and baths, Slate Laundry Tubs, Grilles, etc. It is free. Or send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from **$12** to **$200.**

W. H. OSTENDORF, - - - - - - - 2417 N. Broad St., Philadelphia, Pa.

The Ideal Ventilator



10 Reasons Why

This ventilator is the ideal one in fact as well as in name are given in our catalogue. When you read them you will understand why so many are being sold.

SEND FOR CATALOGUE.

Ideal Ventilator Company,
340 Weybosset St.,
PROVIDENCE, R. I.

Branches: Boston Philadelphia New York
AGENTS WANTED.

King's Automatic Weather Strip.
Window and Door Stop.

The only perfectly satisfactory weather strip, window and door stop on the market.

Keeps out cold and dust.

Makes a perfectly tight joint.

Windows can be raised and lowered to desired position without the use of fasteners or of weights.

Do not build a house until you have investigated the merits of these strips.

Write for prices.

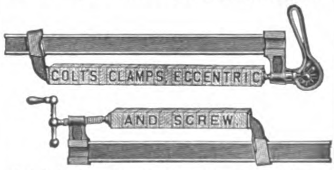
MANUFACTURED BY
The King Manufacturing Co.
Newton, Ia.

GRINDSTONES.

Mounted Grindstones for Carpenters' or Anybody's Use.

THE CLEVELAND STONE CO.,
6th Floor, Hickox Bldg. CLEVELAND, O.

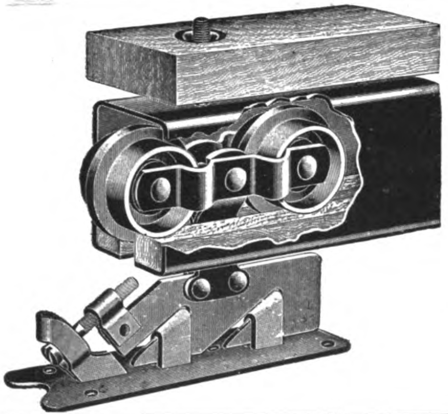
COLT'S CLAMPS



Quick Acting—Time Saving. We make 35 different styles of Clamps to meet the requirements of all classes of WOODWORKERS.

Ask for catalogue No. 129.

BATAVIA CLAMP CO.
23 Center St., Batavia, N. Y.



No. 122 ROYAL

DOOR HANGERS

Ball Bearing ❧ **Noiseless**

Simple in Construction

Modern Design

MRCo. TRADE MARK

Accessible after walls are plastered

Write for catalogue of Door Hangers

The Richards Mfg. Co.

AURORA, ILLINOIS

NEW YORK OFFICE, 101 READE STREET

A Little Talk About Locks

Some know, but more do not, that locks are of three types: warded, lever-tumbler and pin-tumbler.

A *warded lock* is rarely known by that term. It is made only in cheap forms and affords little security. Warded locks have about six key changes.

Lever tumbler locks are made in different grades. If three or more tumblers are used and the lock is well constructed, reasonable security is afforded. The best lever tumbler locks rarely have, however, as many as 500 key changes, most have 12 to 36.

The pin-tumbler type is the third. This was invented by Linus Yale, Jr., in 1860. The genuine YALE LOCK of to-day with paracentric key (made by us only) is the most improved form of the pin-tumbler lock. It is superior in construction as well as in design, and has an unlimited number of key changes.

THE YALE LOCK has many imitators. The genuine may be distinguished by the name YALE on key and cylinder or by our name stamped upon lock and key.

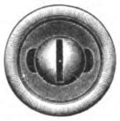
Yale & Towne Locks and Builders' Hardware can be had at all Hardware Stores. Our No. 18 Catalogue contains much information of interest to carpenters and builders. Sent prepaid on request.

The Yale & Towne Manufacturing Co.,

9 Murray St., New York.

THE IVES' PATENT WINDOW STOP ADJUSTER

PATENTED



FOR WINDOWS AND SLIDING DOORS

Insures Protection against Cold Draughts, Dust, Rattling or Binding.

The that only Window Stop Adjuster made from one piece of metal that has a heavy bed will not bend or cup in tightening the screw.

THE H. B. IVES CO.

40 Page Catalog mailed free.

New Haven, Conn., U. S. A

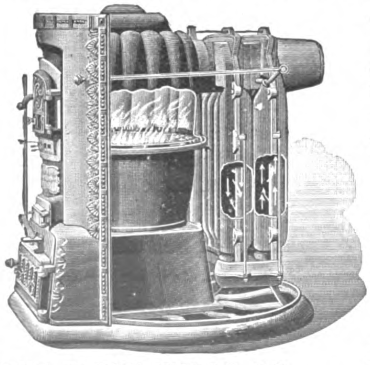
$49 LEADER Steel Furnace

THIS No. 45 Leader Steel Furnace will heat uniformly a 7 or 8 room house, a good sized store, a school, or small church. It is durable, strong, compact. Has steel body with galvanized iron casing. Works easily with coke, hard or soft coal or wood. Has brick fire box. It costs $49, freight paid, east of Omaha. We furnish also plans of your house so you yourself can set up the furnace with its pipes, registers, smoke pipe, etc. Hundreds of people have done it—you can. Write for our new illustrated instruction book on furnaces, "Modern Furnace Heating." It's free. It's valuable. Do it now.

HESS WARMING & VENTILATING CO.,
709 Tacoma Building,
CHICAGO, - ILLINOIS.

MODERN FURNACE HEATING

THE BEST IS THE CHEAPEST



The BENGAL FURNACE

has stood the crucial tests imposed upon it in various places and always came out the victor.

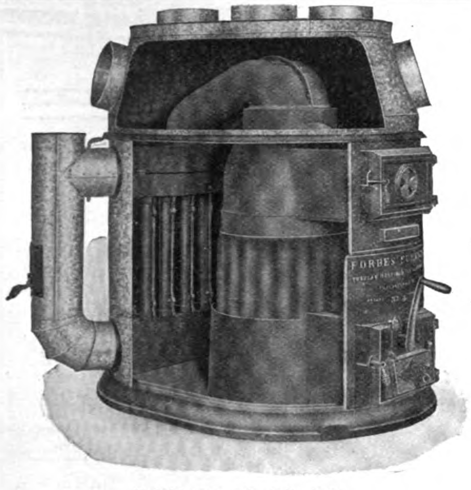
The best evidence of its superiority is that imitators are trying to sell their wares on the merits of the BENGAL, saying it is "just as good."

There are none "just as good."

Full particulars on application.

THE FLOYD-WELLS CO., - Royersford, Pa., U. S. A.

BOOKS. YOU CAN OBTAIN PROMPT ADVICE regarding the books on any subject in which you are interested by addressing DAVID WILLIAMS COMPANY, Publishers and Booksellers, 14-16 Park Place., N. Y.


Height over all, 4 ft. 3 in.

THE FORBES FURNACE

Burns Either Hard or Soft Coal

EVERY ONE GUARANTEED
IF PROPERLY INSTALLED

No Sheet Iron Drums—Entirely Cast Iron —Radiating Drums 1-8 Inch Thick, Will Wear for Years

YOU RUN NO RISK IN PUTTING IN THE FORBES FURNACE

SEND FOR CATALOG AND FULL PARTICULARS

Tubular Heating & Ventilating Co.
228 Quarry St., Philadelphia

Carpenters and Builders

cannot afford to be without the **HOOD LUMBER READY RECKONER,** a section of which we show herewith. Your figuring is done for you on all sizes and lengths of studding, joist, and timber from 1 piece to 100 pieces and then on 125, 150, 175 and so on to three and four hundred pieces of each size. There are more than 15,000 separate calculations and nearly as many more of odd sizes. There is a table giving the feet in all sizes of casing and base finishing lumber, and small sizes of high priced piece stuff. The Doyle and Scribner log rule, a table on wages, a few guides and estimates on brick and stonework, plaster, shingling, flooring, etc., a table of cistern capacity, also on weight of a cubic foot of different materials.

The book is worth $10.00 to any builder and especially so to the beginner, but as we publish it as an advertisement of the HOOD WARM AIR FURNACES, it will be sent on receipt of 50c. postage paid.

		20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
2×8	12	320	336	352	368	384	400	416	432	448	464	480	496	512	528	544	560	576	592	608
	14	373	392	410	429	448	466	485	504	522	541	560	578	597	616	634	653	672	690	709
	16	426	448	469	490	512	533	554	576	597	618	640	661	682	704	725	746	768	789	810
4×4	18	480	504	528	552	576	600	624	648	672	696	720	744	768	792	816	840	864	888	912
	20	533	560	586	613	640	666	693	720	746	773	800	826	853	880	906	933	960	986	1013
	22	586	616	645	674	704	733	762	792	821	850	880	909	938	968	997	1026	1056	1085	1114
	24	640	672	704	736	768	800	832	864	896	928	960	992	1024	1056	1088	1120	1152	1184	1216
	26	693	728	762	797	832	866	901	936	970	1005	1040	1074	1109	1144	1178	1213	1248	1282	1317

Size of book, 4 1-2 x 7 inches, 58 pages and six blank ones for other tables to be inserted.

Send order to-day and get our furnace catalogue.

HOOD FURNACE & SUPPLY CO.
CORNING, N. Y.


MANTEL TYPE
to fit ordinary fire place.

HEAT
When and Where You Want It

Garwood Heaters

Steam and Gas Combined

No Flue Required. No Odor. Atmosphere kept normal. Burn no more Gas than two ordinary Illuminating Burners. Change a Cold Room to a Comfortable One. Send for Catalogue

The Frank C. McLain Co.
900 So. Cleveland Ave., Canton, Ohio


PORTABLE TYPE
to set anywhere in room.

Our line of Heating Apparatus is too extensive to illustrate here. This is only one of the many styles. Your local dealer should have our full line of catalogs. If he hasn't, write us, giving his name.

INTERNATIONAL HEATER CO.

Makers of Boilers and Furnaces.
UTICA, N. Y.
New York. Boston. Chicago.

House Hints

FOR THOSE WHO BUILD, BUY, IMPROVE OR RENT.

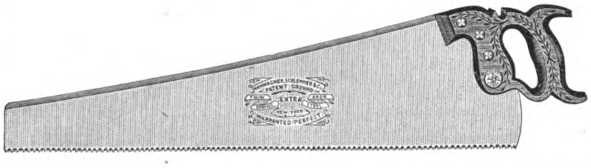
Sets forth many things for your careful consideration, beginning with the choice of site and taking up constructional features, house fittings and furnishing.

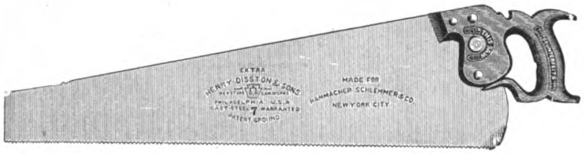
Second edition, enlarged. A pamphlet of 55 pages. Size 6 x 9 inches.

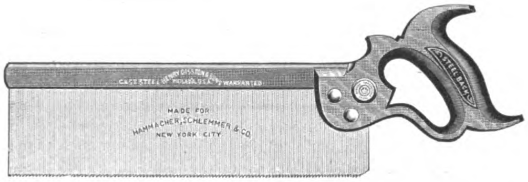
FIFTY CENTS, POSTPAID

DAVID WILLIAMS COMPANY
14-16 Park Place, New York.

SAWS







**DO YOU BUY, USE
or
WANT TO KNOW
ABOUT SAWS?**

**THEN SEND FOR OUR CATALOGUE
No. 1933,**

describing Hand, Ship Carpenter's, Gauge, Mitre Box, Back, Dovetail, Joiner, Plumbers', Pruning, Compass, Keyhole, etc., etc., and also a number of pages of Saw Sets.

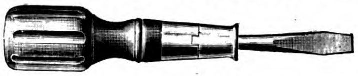
We also have a special 48-page Catalogue of Planes exclusively. This illustrates almost everything called Plane.
If interested ask for Catalogue No. 1934.

HAMMACHER, SCHLEMMER & CO.

HARDWARE, TOOLS and SUPPLIES,
NEW YORK, SINCE 1848.
4th Avenue and 13th Street, **(Block South of Union Square.)**

TOWER'S CHAMPION SCREW DRIVERS

FOR SIXTEEN YEARS THE ACKNOWLEDGED STANDARD.



Every Blade Is Tested to Split a Screw Head.

AVOID Imitations of CHAMPION Screw Drivers. None Genuine without the name "CHAMPION" which is our Trade Mark and Guarantee.

TOWER & LYON CO.

95 Chambers Street, New York.

"Forstner" Brace and Machine Bits

For Fine Carpenter, Cabinet and Pattern Work

Specially Adapted for Hardwood Working.

The Forstner Labor-Saving Auger Bit, unlike other bits is guided by its *Circular Rim* instead of its centre; consequently it will bore any arc of a circle and can be guided in any direction regardless of grain or knots, leaving a true polished surface. It is preferable and more expeditious tnan chisel, gouge, scroll-saw, or lathe tool combined, for core-boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon moulding and mortising, etc.

To introduce this high grade tool among carpenters, pattern makers, and others, we will mail to any reader of "Carpentry and Building," upon receipt of 50c. any bit we make from 1/4 inch to 1 inch in size.

Manufactured by

The Progressive Mfg. Co., Dept. "A", Torrington, Conn.

Enquire of your Hardware Dealers or write us direct. Supplied in Sets. Write for Catalogue.

SASH CHAIN

CABLE CHAIN

JACK CHAIN

The SMITH & EGGE MFG. CO.

Bridgeport, Conn.

Manufacturers of "Giant Metal" Sash Chains
" " "Red Metal" " "

Cable Chains, Jack Chain, Bell Hangers' Chains and Plumbers' Chains
Made in Brass, Copper and Steel

WRITE FOR CATALOGUES AND PRICES

We are the ORIGINATORS of SASH CHAIN as a SUBSTITUTE for sash cord

---

Builders' Hardware

FREE

Our Catalog with net prices sent to contractors and material men upon request.

New Illustrated Catalog and Net Price List.

This publication contains latest designs and finishes in builders' hardware, with over 1000 illustrations and 40 different designs in 15 different finishes.

REHM HARDWARE CO., 354 Blue Island Ave., Chicago, Ill.

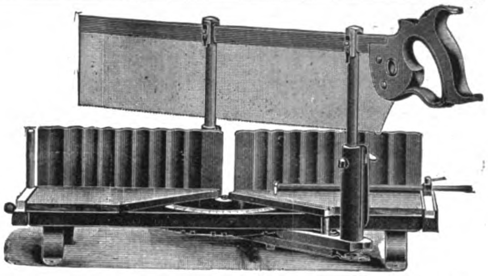
GOODELL MITRE BOX

MADE ENTIRELY OF STEEL. NO MORE BREAKING.
FIRST IN QUALITY AND IMPROVEMENTS.

AUTOMATIC STOPS FOR HOLDING UP SAW.
CORRUGATED BACKS. GRADUATED.
GAUGE FOR DUPLICATE CUTS and many other features.

If you want the best you will take no other.
Send for Circular K.

GOODELL MFG. CO., Greenfield, Mass.



THE AKRON ECLIPSE LEVELS

Manufactured by **The BAKER McMILLEN CO.** AKRON, OHIO.

We have a proposition that will interest every carpenter. Drop us a postal and we will send it to you.

Pat. June 12, 1888
Other pat's pending

Barrett's Improved Combination Roller Gauge

Appeals to all practical carpenters. It is quickly adjusted with only one screw, direct from the centre, fastening both beams in their proper place. A simple device holds the beams in position while being adjusted. It is accurately made and finely finished. One trial will convince any carpenter of its many advantages over all others. Insist upon having the Improved Style, adjusted by one screw.

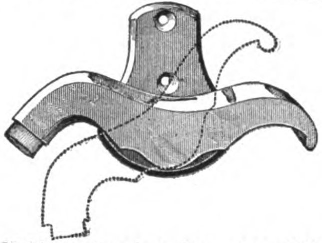
The Leavitt Machine Co.,

Sole Manufacturers,

Orange, Mass., U.S.A.

EMPIRE DOOR HOLDER

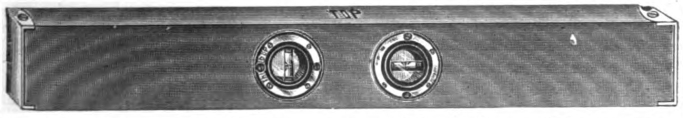
IMPROVED



Holds the heaviest doors on polished floors. 50% greater pressure than any other. Easy to put on, easy to use; the toe operates it. Write for circulars to

CALDWELL MFG. CO.,
5 Jones Street, Rochester, N. Y.

COOK'S LEVEL



For Carpenters, Machinists, Masons.

MADE OF WOOD, IRON, ALUMINUM.
Of all Dealers, or Catalogue on Request.

EVERY LEVEL WARRANTED.

DAVIS & COOK, Watertown, N. Y.

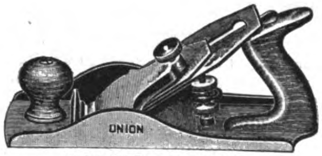
WORTHLEY'S
PATENT

SLOW FEED MANGER

17-Inch Size, $1.60 each.

U are welcome to a copy of our
VANE CATALOGUE

BROAD GAUGE IRON STALL WORKS,
53 Elm St., Boston, Mass.



Union X4 Iron Smooth Plane.

THE GOOD WORKMAN DEMANDS

GOOD TOOLS

UNION "X" PLANES

Union X85 Wood Smooth Plane.

Supply that demand, and it is not difficult to convince the Good Workmen of the Country that they are the Planes they want. They are rigid and solid, easy of adjustment, but a Plane that will "stay set" when adjusted.

A FIRST-CLASS PLANE

The cutters are of heavy steel and the same thickness throughout. This feature, together with the solid Frog, make a Plane that WILL PLANE. Every essential feature of it is right, and properly designed, and properly made.

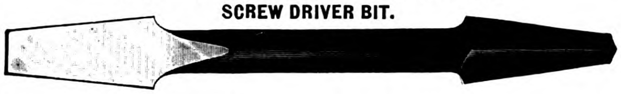
Send for our No. 5 Catalogue, which shows the full line of Planes, Scrapers, etc, etc.
It will interest you.

Union No. X5 Iron Jack Plane.

Union Manufacturing Co.,
NEW BRITAIN, CONN., U. S. A.
WAREHOUSE: 108 Chambers St., New York.

Union No. X26 Wood Jack Plane.

DEMAND and be sure to get
THE VICTOR
SCREW DRIVER BIT.



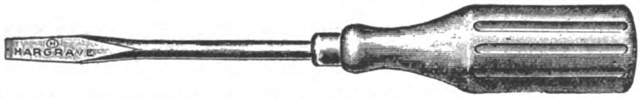
It is the Best that money can buy.
Each one carefully hardened and tempered by itself.
Examined, Tested and *Guaranteed Perfect.*

Drop Forged in assorted sizes.

KRAEUTER & CO.,
NEWARK, N. J.

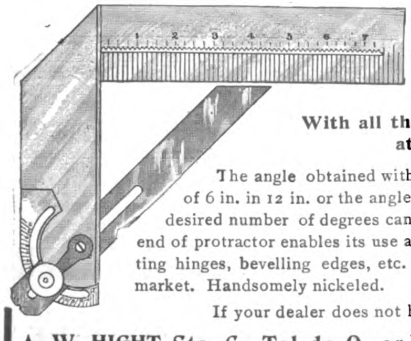
HARGRAVE'S
SCREW-DRIVER
HARD WOOD HANDLE.

HARGRAVE'S TOOLS
BEST QUALITY. FINISH. DESIGN.



The blade is made of round steel, forged with a square taper on the end which is driven firmly into the body of the handle, the strain coming directly under the hand. The point of the blade is ground transversely to prevent any slipping out of the slot of the screw. Well tempered and finished.

Specify these goods to your dealer.
TAKE NO OTHER.
Write for Catalog No. 200.
THE CINCINNATI TOOL CO.,
NORWOOD, CINCINNATI, O.



PATENT APPLIED FOR

HIGHT'S UNION COMBINATION SQUARE

With all the Combinations Available at the Same Time

The angle obtained with its use is one that will give a rise of 6 in. in 12 in. or the angle for bottom of rafter for ¼ pitch. Any desired number of degrees can be obtained instantly. The notch in end of protractor enables its use as a gauge for getting in corners, setting hinges, bevelling edges, etc. The best tool of its kind on the market. Handsomely nickeled.

If your dealer does not have them send $1.00 to

A. W. HIGHT, Sta. C., Toledo, O., or W. B. Colp, Ballard, Wash.

NOW READY

BUILDING CONSTRUCTION AND SUPERINTENDENCE

Part III—Trussed Roofs and Roof Trusses.

SECTION I.
Over 300 Illustrations.

THE CHAPTERS.

Types of wooden trusses and the mechanical principles involved.

Types of steel trusses.

Lay-out of trussed roofs—Bracing of roofs and trusses.

Open timber roofs and church roofs.

Vaulted and domed ceilings, octagonal and domed roofs.

Roof construction for coliseums, armories, train sheds exposition buildings, etc.

Computing the truss loads.

Stress diagrams for vertical loads: (a) symmetrically loaded; (b) unsymmetrically loaded.

One Large 8vo Vol., Cloth.
Price, $3.00 prepaid.

David Williams Company
14-16 Park Place, New York

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from
UNIVERSITY OF MICHIGAN

They Both Hold the Same Position

In the confidence and esteem of an appreciative public.

And no matter whether it be in North America, South America, Europe, Asia, Africa or Australia, mechanics everywhere turn to our books.

← The carpenter and woodworker to this book.

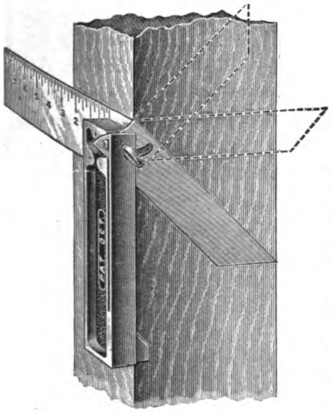
Whenever they wish to post themselves or to find out where they can get tools, machinery and supplies in their respective lines. We shall be proud to send either book to anybody in any place on receipt of 25c.

The metalworker and machinist to this book. →

The Chas. A. Strelinger Co.,
Box B. DETROIT, MICH., U. S. A.

SOMETHING NEW

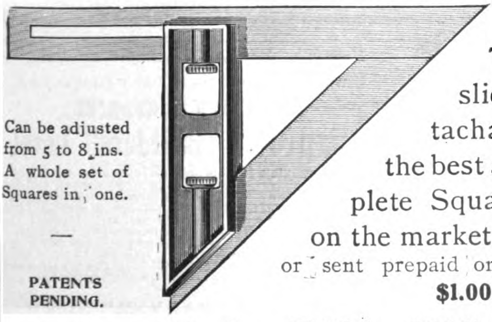
Ideal Bevel Try Square



By having this combination try square you save time, also the price of one tool. You can see by cut how easy it is to change the bevel blade to any desired position to make the square and bevel cut with one stroke of the pencil.

NICHOLLS MFG. CO., OTTUMWA, IOWA.

The Fox Square and Miter Improved



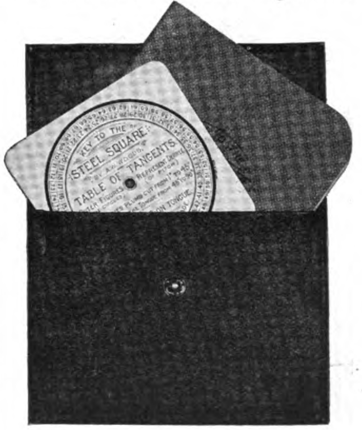
Can be adjusted from 5 to 8 ins. A whole set of Squares in one.

PATENTS PENDING.

This tool with sliding and detachable blades is the best and most complete Square and Miter on the market. Of your dealer or sent prepaid on receipt of price, $1.00.

P. L. FOX, M'f'r,
432 William Street - - BRIDGEPORT, CONN.

KEY TO THE STEEL SQUARE



THIS IS IT. The Key, Book of Instruction and Morocco Case. Full Size 4x5 inches.

It tells the whole story of how to use the common steel square for all kinds of framing.

Ask your hardware dealer to see it. If he has not got it, send **$1.50** to

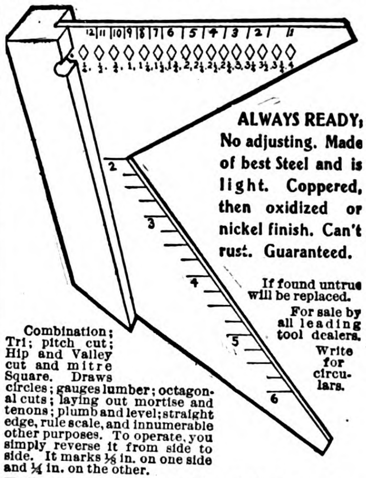
ALFRED W. WOODS,
LINCOLN, NEB. - CHICAGO
109 So. 10th St. 196 5th Ave.

The New Universal Square

"NEW STYLE"

Made in Three Sizes:

No. 6—6 in. No. 10—10 in. No. 18—18 in.



ALWAYS READY, No adjusting. Made of best Steel and is light. Coppered, then oxidized or nickel finish. Can't rust. Guaranteed.

If found untrue will be replaced.

For sale by all leading tool dealers.

Write for circulars.

Combination; Tri; pitch cut; Hip and Valley cut and mitre Square. Draws circles; gauges lumber; octagonal cuts; laying out mortise and tenons; plumb and level; straight edge, rule scale, and innumerable other purposes. To operate, you simply reverse it from side to side. It marks ⅛ in. on one side and ¼ in. on the other.

THE DUBY & SHINN MFG. CO.,
INCORPORATED.
Office and Works, 34 E. 29th St., New York City.

Forest City Bit & Tool Co., Rockford, Ill., U. S. A

Manufacturers of Wood Boring Bits, Hollow Mortising Chisels, Common Mortising Chisels and Tools
Send for CATALOG "G" Send for

FURNACE HEATING.

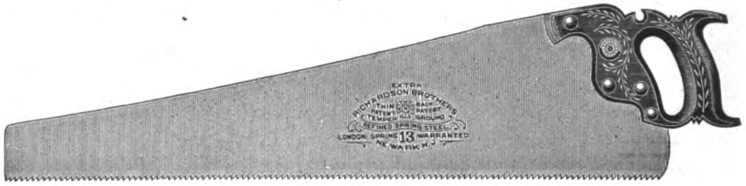
By William G. Snow

With an Appendix on Furnace Fittings.

170 Pages; 90 Illustrations; Size, 6 x 9 inches.
Cloth bound. Price, $1.50.

DAVID WILLIAMS CO.
14-16 Park Place, New York

OLD RELIABLE RICHARDSON SAWS.

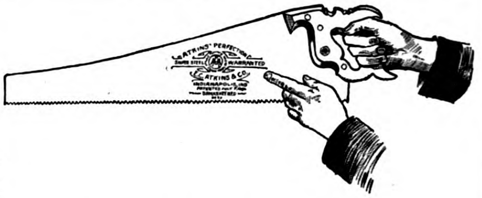


ESTABLISHED 1860.

The peer of them all. Try one and be convinced. Every saw fully warranted.

NATIONAL SAW CO. Operating Richardson Bros. **NEWARK, N. J.**

There's the Saw



Made of SILVER STEEL—will hold its keen cutting edge longer without refiling. Taper ground and balanced just right, it will do its work easily and well. Ask your Dealer for

ATKINS HIGH GRADE SILVER STEEL SAWS

"Finest on Earth."

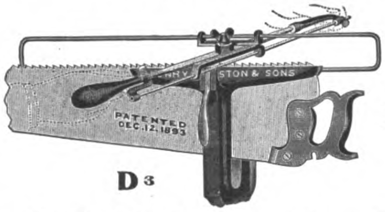
Write for Universal Time Book and Hand Saw Booklet.

E. C. ATKINS & CO., Inc. : Home Office and Factory, Indianapolis, U. S. A.

DISSTON Filing Guide and Clamp.

Especially Designed to assist those not skilled in the art to file a saw correctly.

IT'S PRACTICAL
SEND FOR
DESCRIPTIVE
CIRCULAR.



THIS GUIDE IS
FITTED TO THE
DISSTON Nos. 2 and 3
CLAMPS.

HENRY DISSTON & SONS, INC.,
KEYSTONE SAW, TOOL, STEEL & FILE WORKS,
PHILADELPHIA, PA.

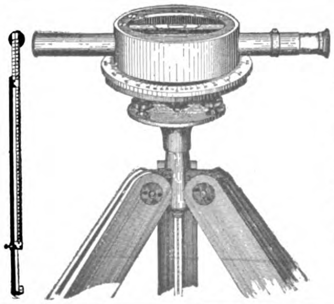
Try "Best" Spring Tempered Steel Edge Groovers and Center Groovers

Brass Rollers, Bronze Edge Groovers and Center Groovers, Spring Tempered Steel Edge Groovers and Center Groovers, Iron Tampers, etc.

The Most Satisfactory Cement Sidewalk Tools in the World

Write for Catalog and Price List

The Woodhouse Hdw. Mfg. Co.
2620 So. 13th St., St. Louis, Mo.



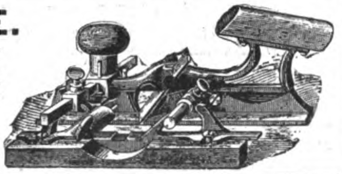
WHAT BUILDERS HAVE BEEN LOOKING FOR

BOSTROM'S Improved Builders' Level

An absolutely reliable leveling instrument for Architects, Builders, Carpenters, and Stone Masons. Can be used for any kind of foundation work and getting angles, is simple in its construction, easily understood, and can be operated by any one. Is made of Brass, oxidized, and has a silvered circle of degrees. Has achromatic Telescope of ample power for such work. Price, including Plumb Bob, Tripod and Graduated Rod and Target, $25.00. Write for circular and be convinced. Every instrument guaranteed.

BOSTROM-BRADY M'F'G CO.,
53½ West Alabama Street,
Atlanta, Ga.

FALE'S PAT. PLANE.



Constituting Carpenter Plow, Dado, Filletster, Matching Sash, Hollows, Rounds, Beads, Rabbets, Nosings, Case Mouldings, Quarter Rounds, &c. The most Compact and Serviceable Tool ever invented. Universally endorsed by carpenters.

AGENTS WANTED.

OTIS A. SMITH, Sole Mfr., Rockfall, Conn.

SPRING PAINTING

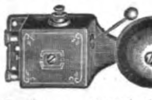
Seasonable talk on Good Paint for the Preservation of all classes of Metal and Wood, is contained in the New Pamphlet B-32.

WRITE FOR A FREE COPY

PAINT DEPARTMENT

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

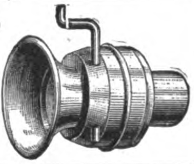
W. R. OSTRANDER & CO., 22 Dey Street, New York City,



Manufacturers of

Speaking Tubes, Whistles, Elevator, House and Hotel Annunciators and Bells, Electric Light Supplies.

Send for Catalogue.



Factory, 1431-1439 DeKalb Avenue, Brooklyn.

"Yankee" Tools.

No. 41—AUTOMATIC DRILL.

No. 42—AUTOMATIC DRILL.

No. 50—RECIPROCATING DRILL FOR WOOD OR METALS.

The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up to date mechanic could buy tools of their quality and character. Other tools are very good tools, but "Yankee" Tools are better. "Yankee" Tools are sold by all leading dealers in Tools and Hardware. Ask your dealer to see them. Our Yankee Tool Book tells all about them. Sent free by

NORTH BROS. MFG. CO., Philadelphia, Pa.

A TOOL THAT'S STAMPED

STANLEY

IS THE BEST OF IT'S KIND

IMPROVED CARPENTERS' TOOLS

Sold by all Hardware Dealers

Stanley Rule and Level Co.

NEW BRITAIN, CONN., U. S. A.

A COMPLETE FRAMING RULE

ON

NICHOLLS FRAMING SQUARE.

On the square is where the carpenter wants his figures, not in a book or on a piece of paper, as they are usually lost.

NICHOLLS MFG. CO.,
OTTUMWA, IOWA.

We have now ready our

New Illustrated Catalogue No. 19

devoted exclusively to

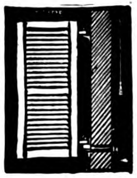
Wood Workers' Tools

Containing **250** pages, **1100** illustrations, handsomely printed on good paper, it makes a convenient and valuable book for **all woodworking mechanics.**

Sent to any address on receipt of 10 cents postage.

WM. P. WALTER'S SONS,
TOOL HEADQUARTERS
1233 Market St., Philadelphia.

Mallory Shutter Worker.

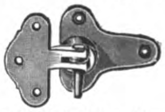


Works and locks the blinds from the inside. Ornamental, durable, perfect working. Applicable to old or new buildings.

Manufactured by
MALLORY MFG. CO.,
Flemington, N. J.

Automatic Blind Hinges

HALE & BENJAMIN'S PATENT



Flush and surface for wood and brick building. Easy to put on, strong and durable. **Warranted.** Also combination awning hinges. With these hinges blinds will not slam or blow off. They are the only hinges adapted to bay or mullion windows, as they require no other fixtures. Testimonials on request from dealers, contractors, and people who have used them several years. We are the sole owners of these two patents. If your dealer does not keep them write to

PARKER WIRE GOODS COMPANY,
Manufacturers,
No. 1 Assonet Street, Worcester, Mass.

Use Our

Folding and Adjustable Handle Draw Knife!

It is adjustable to any position, adaptable to the awkward places, absolutely rigid when set, handy and compact, a time saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

Write for Prices and Discounts.

A. J. WILKINSON & CO.
180-188 Washington St., Boston, Mass., U.S.A.

The Rich Handy Drawing Outfit

Saves Time

for the draughtsman, and is a great aid to the learner. It holds a number of sheets or a pad, which requires no fastenings. The Protractor T Square gives accurate angles. You get measurements direct from the board. Has a drawer for instruments, and can be carried around to make drawings on the spot. Circulars free.

J. & G. RICH, 122 N. 6th St., Phila., Pa.

Send for Catalogue No. 62

Giving description of books on Architecture, Building, Engineering and allied subjects. Sample of "Architects & Builders Magazine" sent on request.

Published monthly at $2.00 a year.
Foreign Subscriptions, $3.00 a year.

WM. T. COMSTOCK, Pub., 23 Warren Street, N.Y.

Economy in Shades

lies in buying those that reflect the most light, and last the longest Frink's Reflecting Shades are the best made. All sizes and styles.

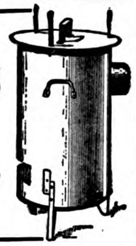
I. P. FRINK, 551 Pearl St., New York.

A 7½ HAND SAW

This is not a PRIZE but a JEWEL. If your dealer cannot furnish you one of our CELEBRATED NARROW A 7½ HAND SAW, 6 inch at butt, 1½ inch at point, 4 gauges thin on back, send us P. O. Order for $2.00 and we will send, express prepaid, 26 inch SAW in Canvas Scabbard.

C. E. JENNINGS & CO.,
101 Reade Street, NEW YORK.
SOLE MANUFACTURERS.

Plasterer's
DRYING STOVES



2 sizes
Send for price.

The S. M. Howes Co.,
40-46 Union St.
BOSTON, MASS.

STANDARD FOR 30 YEARS

This name stamped on every three feet is a guarantee that you are getting the best sash cord that can be made.

SILVER LAKE CO.,
Boston, Mass.

A Good Square Offer

If there's any tool that must be right it's the square. No wonder it's the emblem and by-word of all that is good and right. We guarantee the square we sell and the price is as square an inducement as we can offer to secure your first order.

$1.00

Here's the description:
This Carpenter's Nickel-plated Steel Square 24 inches long, 2 inches wide, tongue 16 inches long, 1½ inches wide. Graduated; face $\frac{1}{16}$, $\frac{1}{8}$; back $\frac{1}{32}$, $\frac{1}{12}$, $\frac{1}{16}$, Brace measure, 8 square and Essex board measure.

$1.00

White, Van Glahn & Co.
14 Chatham Square, New York City.

TAINTOR
Positive Saw Set

TRY IT If you like it tell others
If you don't like it tell US

Send for our circular which contains HINTS on the

CARE of SAWS

Free on application.

TAINTOR MFG. CO.
113 Chambers St., New York

MONARCH Sash Chain

IS THE BEST.

Samples free. Mention this paper.

The Bridgeport Chain Co.
Bridgeport, Conn.

SAMSON SPOT CORD

Distinguished by our trade-mark, the Colored Spot.

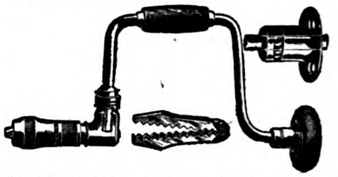
Outwears any other device for hanging windows.

SAMSON CORDAGE WORKS, Boston, Mass.

Ask for
MILLERS FALLS CO.'S BIT BRACES

Series Nos.	30	31	32	33
	14	12	10	8 inch sweep.

There are no other braces made which match them in merit and beauty of finish.



Our name appears on all genuine goods. Look for it before you buy. If your dealer does not keep Millers Falls Braces then write to us.

Millers Falls Company
28 Warren Street, New York, N. Y.

THE FORD AUGER BIT

FORD AUGER BIT CO., Holyoke, Mass.

The first and only Bit with Patented Concave Twist. The best Bit for all round work yet produced. It is worth your time to try one and see.

BURLINGTON
VENETIAN BLIND CO.
MAKERS OF
BLINDS
AND SCREENS
BURLINGTON, VT.

SOME STARRETT TOOLS FOR WOOD WORKERS.

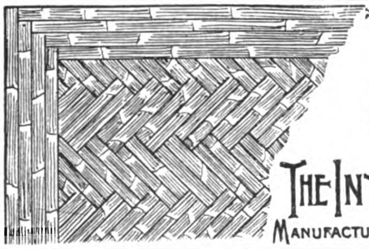
Send for free Catalogue No. 17 P, Illustrated, 176 Pages.

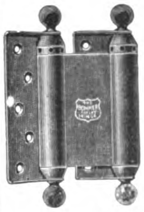
THE L. S. STARRETT CO., Athol, Mass., U. S. A.

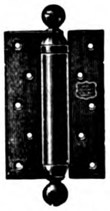
Carpentry and Building

WITH WHICH IS INCORPORATED
The Builders' Exchange

VOL. XXVIII. No. 6. NEW YORK, JUNE, 1906. Ten Cents a Copy. One Dollar a Year.







Alphabetical List of Advertisers.

American Column Co.	56
American Rolling Mill Co.	11
American School of Correspondence	55
American Wood Working Machinery Co.	6
Asphalt Ready Roofing Co.	1
Atkins, E. C. & Co.	66
Baker McMillen Co.	68
Barnes, W. F. & John Co.	4
Barnes Tool Co.	8
Barnett, G. & H., Co.	1
Batavia Clamp Co.	61
Berger Mfg. Co.	10
Bommer Bros.	1
Boston Bolt Co.	9
Bostrom-Brady Mfg. Co.	61
Boynton Furnace Co.	18
Bracket Hook Co.	16
Bradt Pub. Co.	17
Bridgeport Chain Co.	68
Broad Gauge Iron Stall Wks.	61
Burlington Venetian Blind Co.	68
Burritt, A. W. Co.	57
Burt Mfg. Co.	16
Cabot, Samuel	1
Caldwell Mfg. Co.	66
Canton Steel Roofing Co.	11
Cement Machinery Co.	8
Chattanooga Roofing & Fdy. Co.	49
Chicago Machinery Exchange	7
Cincinnati Tool Co.	64
Cleveland Stone Co.	65
Columbia Mineral Wool Co.	18
Comstock, Wm. T.	68
Cordesman, Meyer & Co.	10
Cortright Metal Rfg. Co.	13
Crescent Machine Co.	8
Davis & Cook	63
Diamond Expansion Bolt Co	8
Disston, Henry & Sons	66
Dixon, Jos., Crucible Co.	67
Drouve, G. Co.	11
Duby & Shinn	65
Eastern Granite Roofing Co.	14
Edwards Mfg. Co.	10
Eller Mfg. Co.	14
Energy Elevator Co.	17
Enterprise Fdry. Co.	6
Fay, J. A. & Egan Co.	5
Floyd, Wells Co.	61
Ford Auger Bit Co.	68
Forest City Bit & Tool Co.	64
Foster Munger Co.	58
Fox Machine Co.	10
Fox, P. L.	65
French, Samuel H. & Co.	16
Frink, I. P.	68
Gage Tool Co.	18
Globe Ventilator Co.	16
Goodell Mfg. Co.	63
Grand Rapids Hdw. Co.	58
Grand Rapids Wood Carving Co.	59
Grinnell Publishing Co.	17
Hamlin, George R.	11
Hammacher, Schlemmer & Co.	62
Hartmann Bros. Mfg. Co.	58
Hess Warming & Ventilating Co.	61
Hight, A. W.	64
Howes, S. M., Co.	68
Hurley Machine Co.	8
Ideal Concrete Machinery Co.	7
Interior Hardwood Co.	1
International Cor. Schools	8
International Heater Co.	61
Ives, Hobart B. & Co.	60
Jennings, C. E. Co.	68
Johnson, E. J., Co	15
Johnson, S. C., & Son	54
"Joinery"	9
Kanneberg Rfg. & Ceil. Co.	9
Karol, B. C.	18
Kees, F. D. Mfg. Co.	59
Keighley, S. Metal Ceiling & Mfg Co.	13
Kidder, R. E.	9
Kimball Bros. Co.	17
King Mantel Co.	58
King Mfg. Co.	59
Kinnear & Gager Co.	14
Kraeuter & Co.	64
Lane Bros. Co.	59
Leavitt Machine Co.	68
Lestershire Lumber & Box Co	16
Long Island Machinery Co.	5
Lord & Burnham Co.	12
Lorenzen, Chas. F. & Co.	57
Mallory Mfg. Co.	67
Marston, J. M. & Co.	5
Mesker & Bro.	15
Meyers, F. J. Mfg. Co.	10
Miller, A. W., Mfg. Co.	18
Millers Falls Co.	68
Miracle Pressed Stone Co.	9
Montross Metal Shingle Co.	15
Morse, Williams & Co.	17
Morton, Thomas	58
Mullins, W. H. Co.	13
National Mfg. Co.	59
National Roofing Co.	13
National Saw Co.	66
Nat'l Sheet Metal Rfg. Co.	11
New Jersey Zinc Co.	15
N. Y. Steel Corner Plate Co.	15
Nicholls Mfg. Co.	65&67
North Bros. Mfg. Co.	67
O. K. Harry Steel Wks.	5
Ostendorf, W. H.	59
Ostrander, W. R. & Co.	67
Parker Wire Goods Co.	67
Parks Ball Bearing Machinery Co.	5
Peerless Brick Mch. Co.	9
Pettyjohn Co.	6
Phila. & Boston Face Brick Co.	18
Pike Mfg. Co.	1
Progressive Mfg. Co.	62
Reed & Auerbacher Co.	18
Rehm Hardware Co.	63
Rich, J. & G.	67
Richards Mfg. Co.	60
Sackmann, F. A.	5
Samson Cordage Works	68
Schaller-Hoerr Co.	56
Schmul, H. F.	15
Scott & Co.	11
Sedgwick Mch. Works	17
Seneca Falls Mfg. Co.	4
Shimer, Samuel J. & Sons	8
Silver Lake Co.	68
Simonds Mfg. Co.	18
Smith, Otis A.	67
Smith & Egge Mfg. Co.	68
Standard Paint Co.	10
Stanley Rule & Level Co.	67
Stanley Works	1
Star Encaustic Tile Co.	11
Starrett, L. S. Co.	1&68
Stowell Mfg. Co.	12
Strelinger, C. A. Co.	65
Taintor Mfg. Co.	68
Topp, G. A. & Co.	12
Tower & Lyon	62
Truss Metal Lath Co.	16
Tubular Heating & Ventilating Co	61
Union Mfg. Co.	64
U. S. Mineral Wool Co.	18
Van Dorn Iron Wks. Co.	5
Waddell Mfg. Co.	58
Wagner Mfg. Co.	11
Walters, Wm. P. Sons	67
Warner Elevator Mfg. Co.	17
Washburne, E. G. & Co.	8
Wheeling Corrugating Co.	12
White, Van Glahn & Co.	68
Wilkinson, A. J. & Co.	67
Willis Mfg. Co.	13
Woodhouse Hdw. Mfg. Co.	66
Wood-Mosaic Flooring Co.	18
Woods, A. W.	65
Yale & Towne Mfg. Co.	60

Classified List of Advertisers.

Annunciators
Ostrander, W. R. & Co.

Architects' Blue Prints
Schmul, Henry Fred.

Architects' Details
Lestershire Lumber & Box Co.

Asbestos
Stowell Mfg. Co.

Auger Bits
Ford Auger Bit Co.
Jennings, C. E. Co.

Awnings
Chattanooga Roofing & Fdry. Co.
O. K. Harry Steel Works

Band Saws
American Wood Working Machinery Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Crescent Machine Co.
Fay, J. A. & Egan Co.

Barrel Swings
Leavitt Machine Co.

Blackboards, Slate
Johnson, E. J. Co.

Blinds
Burlington Venetian Blind Co.
Foster-Munger Co.
Schaller-Hoerr Co.

Blind Hinges
Parker Wire Goods Co.
Stanley Works

Bolts and Nuts
Boston Bolt Co.

Books
Arthur, Wm.
Bradt Pub. Co.
Comstock, Wm. T.
Grinnell Pub. Co.
Williams, David, Co.

Boring Machines
Fox Machine Co.
Millers Falls Co.

Bracket Hangers
Wagner Mfg. Co.

Brick Machinery
Cement Machinery Co.
Peerless Brick Machine Co.

Builders' Hardware
Boston Bolt Co.
Hammacher, Schlemmer & Co.
Rehm Hardware Co.
Yale & Towne Mfg. Co.

Building Brackets, Folding
Stanley Works
Tower & Lyon Co.

Building Material
Lestershire Lumber & Box Co.

Building Paper and Felt
Cabot, Samuel.
Standard Paint Co.

Builders' Supplies
Schaller-Hoerr Co.

Butts and Hinges
Stanley Works.

Capitals
Grand Rapids Wood Carving Co.
Waddell Mfg. Co.

Ceiling, Metallic
Berger Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Keighley, S. Metal Ceiling & Mfg. Co.
Kinnear & Gager Co.
Wheeling Corrugating Co.
Willis Mfg. Co.

Cement
French, S. H. & Co.

Cisterns, Steel
O. K. Harry Steel Works.

Clamps
Batavia Clamp Co.
Cincinnati Tool Co.

Concrete Block Machines
Cement Machinery Co.
Enterprise Fdry. Co.
Ideal Concrete Machinery Co.
Miracle Pressed Stone Co.
Peerless Brick Machine Co.
Pettyjohn Co.

Conductor Pipes
American Rolling Mill.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.

Conservatories
Lord & Burnham Co.

Contractors' Supplies
Boston Bolt Co.

Cornices, Sheet Metal
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mesker & Bro.
Mullins, W. H. Co.
Willis Mfg. Co.

Cresting
Van Dorn Iron Works Co.
Willis Mfg. Co.

Cutter Heads
Shimer, Sam'l J. & Sons.

Designs and Details
(See House Plans)

Door Checks and Springs
Hammacher, Schlemmer & Co.

Door Checks, Screen
Caldwell Mfg. Co.

Door Hangers
Lane Bros. Co.
National Mfg. Co.

Draw Knives
Wilkinson, A. J. & Co.

Drawing Instruction
International Correspondence Schools.

Drawing Outfits
Comstock, Wm. T.
Rich, J. & G.

Drying Stoves
Drouve, G. Co.
Howes, S. M. Co.

Dumb Waiter Fixtures
Hammacher, Schlemmer & Co.

Eave Troughs
Chattanooga Roofing & Fdry. Co.
Eller Mfg. Co.
Wheeling Corrugating Co.

Elevators and Dumb Waiters
Energy Elevator Co.
Kimball Bros. Co.
Meyers, F. J. Mfg. Co.
Morse, Williams & Co.
Sedgwick Machine Works.
Warner Elevator Mfg. Co.

Etching Fluid
Reed & Auerbacher Co.

Exhaust Heads
Burt Mfg. Co.

Expansion Bolts
Boston Bolt Co.
Diamond Expansion Bolt Co.

Fencing
O. K. Harry Steel Works.

Files and Rasps
Barnet, G. & H. Co.
Boston Bolt Co.

Floor Scrapers
Hurley Machine Co.

Framing Tools
Topp, G. A., & Co.

Furnaces and Heaters
Boynton Furnace Co.
Floyd-Wells Co.
Hess Warming & Ventilating Co.
International Heater Co.
Tubular Heating & Ventilating Co.

Gas and Electric Fixtures
Frink, I. P.

Grates
King Mantel Co.

Grates, Fancy Plated
Chattanooga Roofing & Fdry. Co.

Greenhouses
Lord & Burnham Co.

Grille Work, Wood
Foster-Munger Co.
Waddell Mfg. Co.

Grindstones
Cleveland Stone Co.
Richards Mfg. Co.

Grooving Heads
Fox Machine Co.

Hangers, Barn Door
Richards Mfg. Co.

Hangers, House Door
Richards Mfg. Co.

Hardware Jobbers
White, Van Glahn & Co.

Hardware Specialties
Richards Mfg. Co.

Hasps, Hooks and Staples
Woodhouse Hdw. Mfg. Co.

Heaters.—*Steam and Hot Water.*
International Heater Co.
Lord & Burnham Co.

Hinges, Spring
Bommer Bros.

Hinges, Window Screen
Kees, F. D. Mfg. Co.

House Plans
Comstock, Wm. T.

Iron House Fronts
Mesker & Bro.

Iron Work
Van Dorn Iron Works Co.

Lath, Metal
Truss Metal Lath Co.
Wheeling Corrugating Co.

Levels
Baker, McMillen Co.
Bostrom-Brady Mfg. Co.
Davis & Cook.

Lightning Rods
Washburn, E. G. & Co.

Locks
Rehm Hardware Co.
Yale & Towne Mfg. Co.

Lumber and Shingles
Lestershire Lumber & Box Co.

Mangers, Slow Feed
Broad Gauge Iron Stall Works.

Mantels
Burritt, A. W., Co.
Foster-Munger Co.
French, Sam'l H. & Co.
King Mantel Co.
Lorenzen, C. F. & Co.
Ostendorf, W. H.
Phila. & Boston Face Brick Co.

Masons' Stoves
Drouve, G. Co.

Metal Lath
Truss Metal Lath Co.

Mill Work
Schaller-Hoerr Co.

Mineral Wool
Columbia Mineral Wool Co.
U. S. Mineral Wool Co.

Miter Boxes
Goodell Mfg. Co.
Nicholls Mfg. Co.

Miter Machines
Fox Machine Co.

Miters
Fox, P. L.

Moldings
American Column Co.
Grand Rapids Wood Carving Co.
Schaller-Hoerr Co.
Waddell Mfg. Co.

Mortar Colors
French, Sam'l H. & Co.

Mortisers, Hand
Miller, Albert W., Mfg. Co.

Oil Filters
Burt Mfg. Co.

Ornamental Sheet Metal Work
Mullins, W. H. Co.

Ornamental Wire, Iron, Steel and Brass Work
Meyers, F. J. Mfg. Co.

Paint
New Jersey Zinc Co.
Standard Paint Co.

Parquette Flooring
Interior Hardwood Co.
Johnson, S. C., & Son.
Wood-Mosaic Flooring Co.

Patent Lawyers
Hamlin, George R.

Pencils
Dixon, Jos. Crucible Co.

Planes
Gage Tool Co.
Smith, Otis A.
Tower & Lyon Co.
Union Mfg. Co.

Plasterers' Corner Plates
New York Steel Corner Plate. Co.

Plastic Ornaments
French, Samuel H. & Co.

Plumbers' Supplies
Karol, B. C.

Porch Columns
American Column Co.
Hartman Bros. Mfg. Co.

Post and Mining Machinery
Cement Machinery Co.

Reflectors
Frink, I. P.

Roof Brackets
Wagner Mfg. Co.

Roofing, Art Metal Tile
Mullins, W. H. Co.

Roofing and Siding
Asphalt Ready Roofing Co.
Berger Mfg. Co.
Canton Steel Roofing Co.
Drouve, G. Co.
Eastern Granite Roofing Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Lincoln Waterproof Cloth Co.
National Roofing Co.
O. K. Harry Steel Works.
Scott & Co.
Standard Paint Co.
Stowell Mfg. Co.
Wheeling Corrugating Co.

Roofing Brackets
Stanley Rule & Level Co.

Roofing Paint
Asphalt Ready Roofing Co.
Dixon, Jos. Crucible Co.

Roofing Slate
Johnson, E. J. Co.

Sash Balances
Caldwell Mfg. Co.

Sash Chains
Bridgeport Chain Co.
Morton, Thomas.
Smith & Egge Mfg. Co.

Sash Cord
Samson Cordage Works.
Silver Lake Co.

Sash Locks
Ives, H. B. & Co.

Sash Operating Devices
Lord & Burnham Co.

Sash Pulleys
Grand Rapids Hardware Co.

Sashes, Doors and Blinds
Foster-Munger Co.
Lestershire Lumber & Box Co.

Saw Clamps
Disston, Henry & Sons.

Saw Filing Guide
Disston, Henry & Sons.

Saw Jointers
Crescent Machine Co.

Saw Sets
Taintor Mfg. Co.

Saw Tables
Chicago Machinery Exchange.
Crescent Machine Co.
Kidder, R. E.

Saws
Atkins, E. C. & Co.
Disston, Henry & Sons.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
National Saw Co.
Simonds Mfg. Co.

Scaffold Brackets
Bracket Hook Co.
Wagner Mfg. Co.

Schools
American School of Correspondence.
International Correspondence Schools.

Screw Drivers
Kraeuter & Co.
North Bros. Mfg. Co.

Sheet Metal Fronts
Mesker & Bro.

Shingles and Tiles, Metallic
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Cortright Metal Roofing Co.
Montross Metal Shingle Co.
National Sheet Metal Roofing Co.
Willis Mfg. Co.

Shingles Hip
Wheeling Corrugating Co.

Shingle Stains
Cabot, Samuel.

Shutter Worker
Mallory Mfg. Co.

Shutters (See Blinds)

Skylights
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Drouve, G. Co.
Edwards Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mullins, W. H. Co.
Willis Mfg. Co.

Speaking Tubes
Ostrander, W. R. & Co.

Spring Hinges
Bommer Bros.

Squares
Duby & Shinn.
Fox, P. L.
Nicholls Mfg. Co.

Squares, Combination
Hight, A. W., Toledo, O.

Steel Figures and Letters
Sackman, F. A.

Steel Square Key
Woods, Alfred W.

Stoves and Ranges
Boynton Furnace Co.

Structural Iron and Steel Works
Boston Bolt Co.

Structural Slate
Johnson, E. J. Co.

Tanks, Steel
O. K. Harry Steel Works.

Tiling
King Mantel Co.
Ostendorf, W. H.
Star Encaustic Tile Co.

Tool Boxes
Walter's Sons, W. P.

Tool Cabinets
Hammacher, Schlemmer & Co.

Tool Chests
Jennings, C. E. Co.

Tools
Forest City Bit & Tool Co.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
Kraeuter & Co.
Millers Falls Co.
North Bros. Mfg. Co.
Progressive Mfg. Co.
Reed & Auerbacher Co.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S., Co.
Strelinger, C. A., Co.
Tower & Lyon Co.
Walter's Sons, Wm. P.
Wilkinson, A. J., & Co.

Turned, Molded Carved Work
Waddell Mfg. Co.

Ventilating Attachment
Drouve, G., Co.

Ventilators
Burt Mfg. Co.
Globe Ventilator Co.

Veranda Stock
American Column Co.

Vises
Hammacher, Schlemmer & Co.

Wagon Jacks
Batavia Clamp Co.

Wax, Finishing and Polishing
Johnson, S. C., & Son.

Weather Strips
Hammacher, Schlemmer & Co.
King Mfg. Co.

Weather Vanes
Broad Gauge Iron Stall Works.

Window Apparatus
Drouve, G. Co.

Window and Door Stops
King Mfg. Co.

Window Fasteners
Stanley Works.

Window Stop Adjusters
Ives, Hobart B., & Co.

Window Trimmings
Caldwell Mfg. Co.

Windows, Fireproof
Mullins, W. H. Co.

Wood Carving
Grand Rapids Wood Carving Co.

Wood Mantels
(See Mantels)

Wood Ornaments
Waddell Mfg. Co.

Wood Trimmers
Fox Machine Co.

Wood Working
Lestershire Lumber & Box Co.

Wood Working Machinery
American Wood Working Mach'y Co.
Barnes, W. F. & John.
Barnes Tool Co.
Chicago Machinery Exchange.
Cordesman Machine Co.
Fay, J. A. & Egan Co.
Fox Machine Co.
Kidder, R. E.
Long Island Machinery Co.
Marston, J. M. & Co.
Parks Ball Bearing Machinery Co.
Seneca Falls Mfg. Co.

Wood Working Machinery, Second Hand
Long Island Machinery Co.

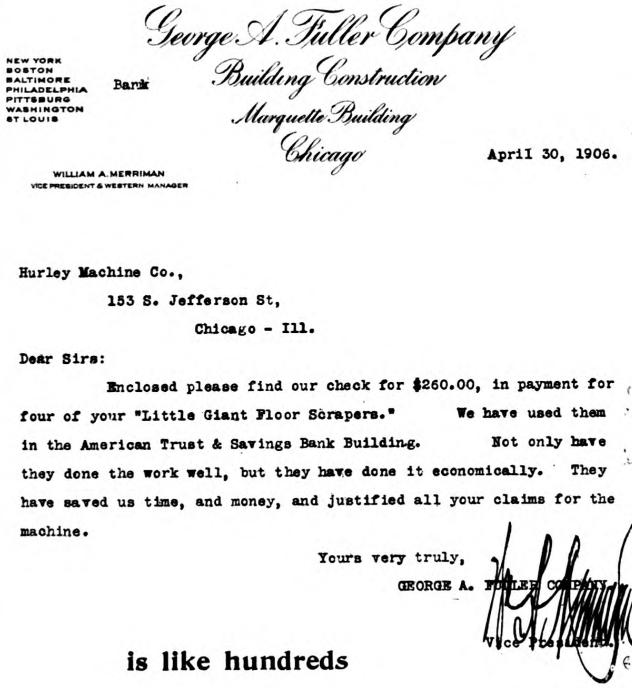
See My Finish!

Watch it spread over millions of feet of flooring—all kinds, from the finest "parquet" to the heaviest—wherever progressive builders appreciate that the old "marrow-bones and elbow grease" method of *yesterday*, can't class with the method of *to-day*.

That I do the work *better, faster* and *cheaper* than any other known method, is the opinion of those who know by experience.

Send for our Circulars.

This one letter



George A. Fuller Company
Building Construction
Marquette Building
Chicago

NEW YORK
BOSTON
BALTIMORE
PHILADELPHIA
PITTSBURG
WASHINGTON
ST LOUIS

Bank

WILLIAM A. MERRIMAN
VICE PRESIDENT & WESTERN MANAGER

April 30, 1906.

Hurley Machine Co.,
153 S. Jefferson St,
Chicago - Ill.

Dear Sirs:

Enclosed please find our check for $260.00, in payment for four of your "Little Giant Floor Scrapers." We have used them in the American Trust & Savings Bank Building. Not only have they done the work well, but they have done it economically. They have saved us time, and money, and justified all your claims for the machine.

Yours very truly,
GEORGE A. FULLER COMPANY,
Vice President.

is like hundreds

Price complete f. o. b. Chicago or New York **$65.00**

TO-DAY

YESTERDAY

The "LITTLE GIANT" Floor Scraper

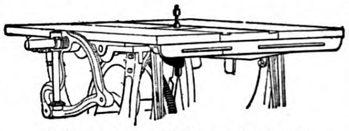
Is a man power machine, the unit of simplicity in construction, and the acme of perfection in performance. Adaptable to any kind or style of floor scraping Easily operated by any one of your men, who can, in a very short time, be finishing 1000 sq. ft. a day. Does it sound too big? Let us show you—it's up to us and we want to do it.

Hurley Machine Co.

153 to 159 South Jefferson St.
CHICAGO, U. S. A.
N. Y. Office, 1010 Flat Iron Bldg.

When You Are Rushed With Work

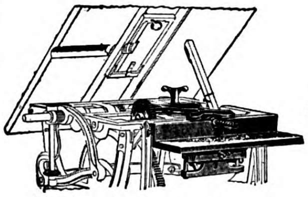
And can't get all of the help you need, then get a "Union" Combination Saw, which will do work equal to 3 additional good men and will do better work than is possible, when using hand tools. The saving of 3 men's wages will soon pay for the machine and means larger profits for you.



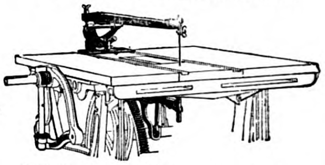
"Union" Moulding Attachment.

No. 5 "Union"

Combination Self-Feed Rip and Cross-Cut Saw



"Union" Boring Attachment.



"Union" Scroll Saw Attachment.

is suitable for various kinds of work—ripping (up to 3½ inches thick), cross-cutting, mitering, etc., and, with additional attachments, rabbetting, grooving, dadoing, boring, scroll-sawing, edge-moulding, beading, etc. Almost a complete workshop in one machine.

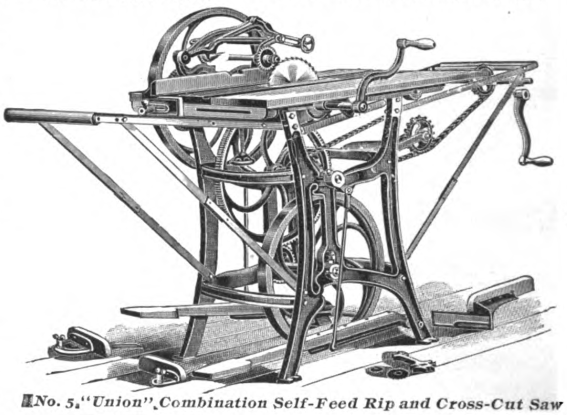
Send for Catalog "A" fully describing our complete line of foot, hand and light power wood working machinery.

The Seneca Falls Mfg. Co.

209 Water St.,

SENECA FALLS, N. Y., U. S. A.

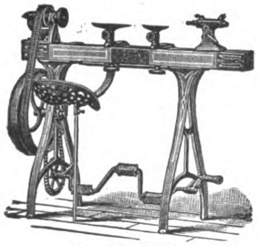
114



No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw

HAND **POWER** **FOOT**

WOOD-WORKING MACHINERY.



No. 3 LATHE.

A Complete Line for a Carpenter and Builder.

Tenoner.

Our Machines are so constructed that you can take them to the house you are building.

. . . Saves Time

No. 2 SCROLL SAW.

No. 7 SCROLL SAW.

Any of our machines will pay for themselves in a year and often in a single job.

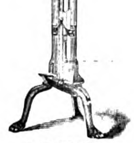
Why buy these Machines? BECAUSE

You can save a mill man's profit.
You can make more money with less capital invested.
You can manufacture in as good style and finish, and at lower cost than the mill.
You can work up stuff ahead in winter for the spring rush in building.
10,000 builders are using from one to eight of our different machines.

Our machines are not complicated, but simple, strong, practical and built for good hard work.

FORMER.

No. 4 SAW.



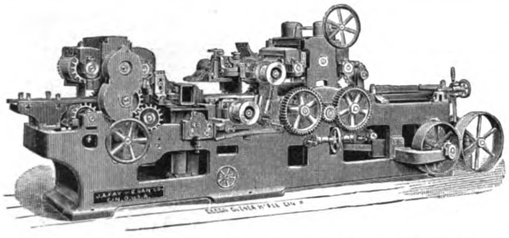
MORTISER

Send for Catalogue and Prices.

W. F. & JOHN BARNES CO., 71 RUBY ST. ROCKFORD ILL.

HAND RIPSAW.

"LIGHTNING" FLOORING MACHINE



THE capacity of this machine is unlimited. The output depends entirely upon the skill of the operator. In its construction absolutely durable workmanship is combined with entire simplicity of design, so that it is easy and convenient to operate and can be depended upon to turn out the most and the best flooring, ceiling, siding, casing, etc.

This machine is made to plane four sides, 9 and 15 inches wide and 6 inches thick. Descriptive circulars give complete details of the steel cylinders, the heavy matching works, the powerful feed, in fact full specifications.

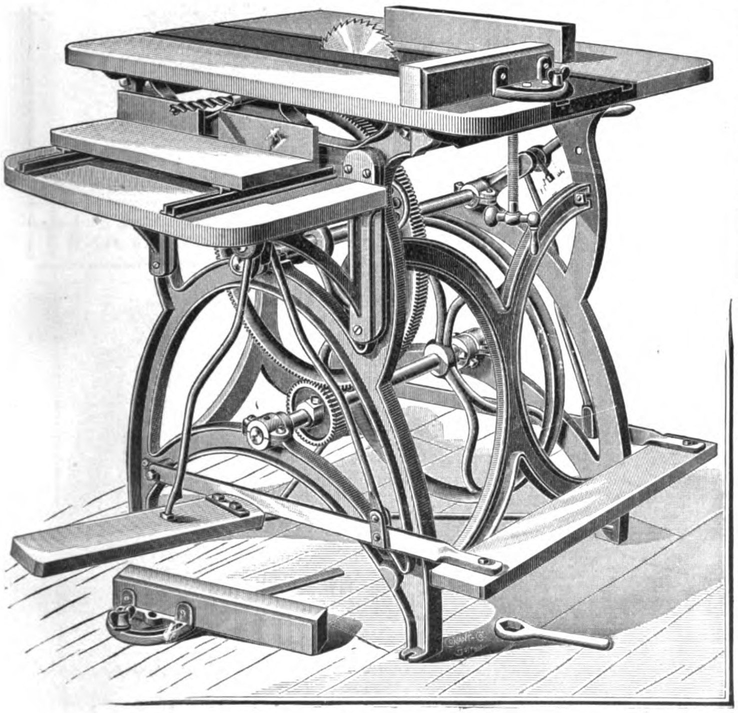
Ask for No. 106 "Lightning" Floorer Circular and Complete Illustrated Catalog.

221-241 W. Front St.,
Cincinnati, Ohio, U. S. A.

J. A. FAY & EGAN CO.

The World's Standard for Woodworking Machinery.

Marston's Hand and Foot Power Circular Saw.



Iron frame, 36 inches high.

Center part of top is made of iron accurately planed, with grooves on each side of saw for gauges to slide in.

Steel shafts and best babbitt metal boxes.

Gears are all machine-cut from solid iron.

Boring table and side treadle.

Two 7-inch saws and two crank handles with each machine.

Weight complete, 350 pounds.

Send for catalogue.

J. M. MARSTON & CO., 201 Ruggles St., Boston, Mass.

VAN DORN IRON WORKS CO
CLEVELAND, OHIO.
STRUCTURAL STEEL & ORNAMENTAL IRON WORK.
JAIL WORK, JOIST HANGERS, IRON FENCINGS.

SECOND-HAND WOOD WORKING MACHINERY

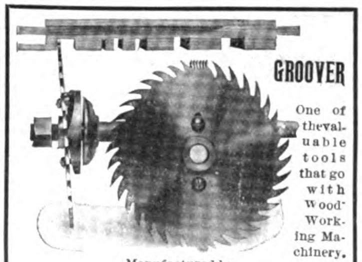
Woods Moulder 12 in. Matchers 24 in.
Berlin Moulder 15 in. Pony Planers 16, 20, 24 in.
Rogers Moulder 8 in.

Variety Machines, Double and Single, Jointers, Swing Saws, Rolling Top Saw Tables, Gas and Gasoline Engines, Band Saws, Routers, Sanders, Circular Saws, Jig Saws.

A1 CONDITION. PROMPT DELIVERY.

All Kinds of Machinery Purchased for Cash.

LONG ISLAND MACHINERY CO.
15 Washington Ave., Brooklyn, N. Y.



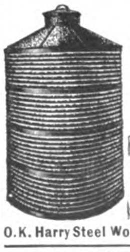
GROOVER

One of the valuable tools that go with Wood-Working Machinery.

Manufactured by
Parks Ball Bearing Machine Co.
Sta. A., CINCINNATI, OHIO.

MARK YOUR TOOLS WITH A
STEEL STAMP.

SEND FOR PRICE-LIST No. 7



Harry's Patent Adjustable Steel Drop Awnings.

Harry's Underground Corrugated Galvanized Steel Cisterns and Tanks

Roofing of all kinds, Fencing, etc
Send for catalogue, prices, etc.

O. K. Harry Steel Works, 2341 Papin St., St. Louis, Mo.

— "I WANT to get some bird seed," said the customer in the seed store.

"No, you don't, smarty," replied the new clerk, recently from the country, "ye can't joke me. Birds grow from eggs, not seed."—*Exchange.*

WOOD WORKING MACHINERY

IF YOU ARE WISE, YOU WILL GET THE BEST.

Don't fail to ask for Catalogue.

WRITE FOR PRICES.

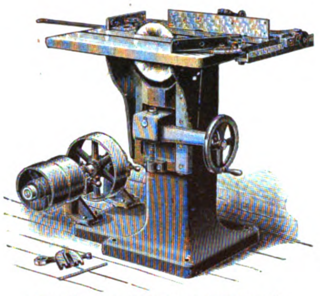


Fig. 638. No 0 Clement Saw Bench.

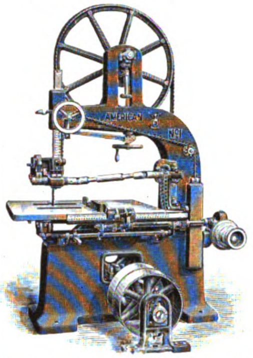


Fig. 5056. American Self-feed Band Rip Saw.

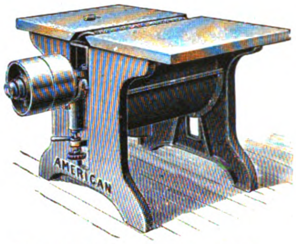


Fig. 1096. Clement Surface Sander.

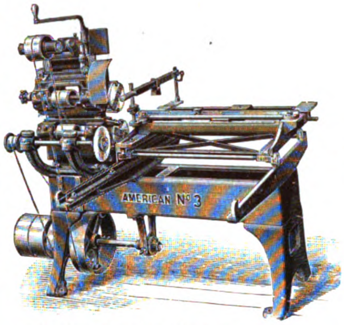


Fig. 958. American No. 3 Tenoner.

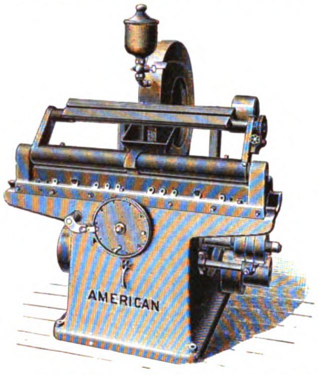


Fig. 1130. No. 200 Glen Cove Automatic Knife Grinder

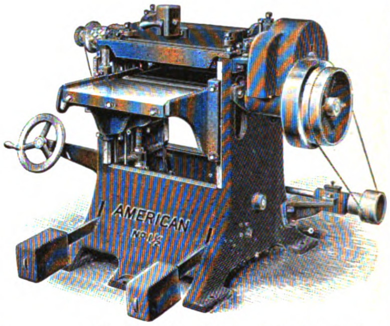
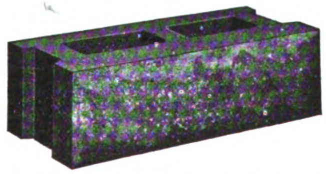


Fig. 7911. No. 1½ American 20 in. and 24 in. x 6 in. Single Surfacer.

AMERICAN WOOD WORKING MACHINERY COMPANY

NEW YORK CHICAGO NEW ORLEANS

Portable Hollow Concrete Block Machine



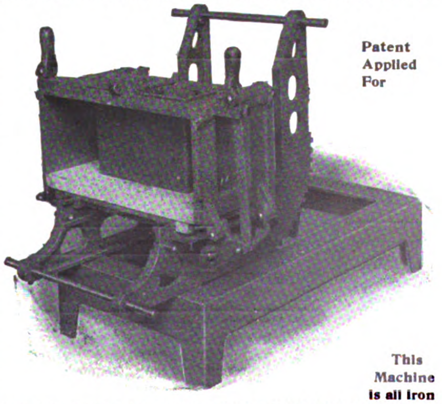
BEST—FASTEST—SIMPLEST—CHEAPEST.

MOVE THE MACHINE—NOT THE BLOCKS

Saves labor of off-bearing, avoids loss by crackage or breakage, saves expense of heavy cumbersome iron pallets. Sand, Water and Portland Cement only materials required. BIG PROFITS. Blocks cost 6 cents to make. Sell for 18 cents. Whole outfit costs $125.00.

FULLY GUARANTEED. SENT ON TRIAL.

THE PETTYJOHN CO., 616 North 6th Street,
TERRE HAUTE, IND.



Patent
Applied
For

This
Machine
is all Iron

The Perfection Cement Block Machine

MAKES THE BEST HOLLOW CEMENT BLOCKS OF ANY MACHINE ON THE MARKET. It Tamps on the Face, an Important Fact to Consider when Purchasing a Cement Block Machine

Outfits from $50.00 up

This machine has reached the height of **Perfection in Simplicity, Durability and Quickness**

DON'T DELAY! DON'T HESITATE!

Send for our Descriptive Circular and Prices.

MANUFACTURED BY

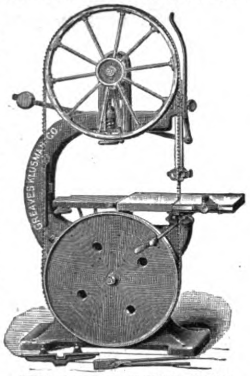
ENTERPRISE FOUNDRY COMPANY

Office and Works: 83 OLEAN STREET ROCHESTER, N. Y.

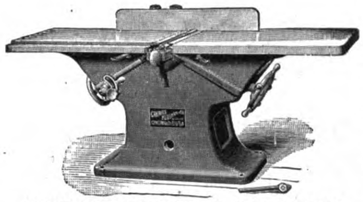
EXPOSITION
OF
Wood Working Machinery
FOR
Carpenters and Builders

Modern in design and construction, with improved methods of adjustment. Circulars and descriptive matter sent upon request.

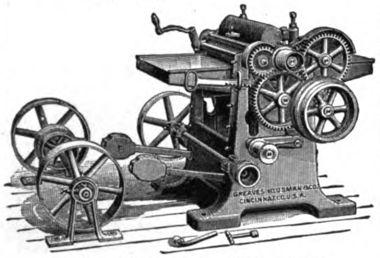
COME AND SEE US!



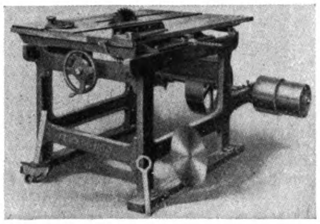
NEW PATENT 36-INCH BAND SAWING MACHINE.
Furnished with rip gauge, roller guards, wood rim wheels, etc. Table can be tilted 45°.



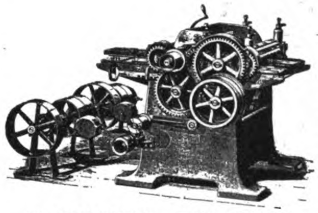
IMPROVED HAND PLANER AND JOINTER,
Tables over 7 feet long and have steel lips.
Cylinder Slotted to receive moulding bits and other irregular knives.
Cylinder has three Bearings, one of which is outside of pulley.



No. 2½ SURFACE PLANING MACHINE.
Planes 24½ inches and any thickness, from 1-16 to 8 inches.



A CARPENTER SHOP IN ITSELF.
CHICAGO No. 2 COMBINATION SAW TABLE.
An excellent machine for ripping, cutting-off, mitering, dadoing, boring, etc.



No. 2½ IMPERIAL 6-ROLL PLANER, MATCHER AND MOULDER.
Cylinder double belted, six large feed rolls. Fast and slow feed. Planes 24¼ inches wide, 8 inches thick, and matches up to 12 inches wide. Weight 3000 lbs.

WRITE FOR PRICES ON REBUILT MACHINERY.

CHICAGO MACHINERY EXCHANGE, 13-15 North Canal Street,
CHICAGO, ILL.

YOU WANT THE BEST

HERE ARE A FEW CONVINCING REASONS IN FAVOR OF "IDEAL"

SIMPLICITY: The "Ideal" has face plate in the bottom of the mould. Cores are moved horizontally by positive lever motion. No gears, no cogs, no wheels, no cranks, no chains, nothing to break or get out of order. You tamp on the face in the "Ideal" mould.

DURABILITY: The "Ideal" block machine is built of the best grey iron castings and polished cold rolled steel shaftings. In no part is strength sacrificed. All parts are perfectly machined and assembled. Will last a lifetime. Examine the picture.

ADAPTABILITY: The "Ideal" is a machine adaptable to any emergency or situation that may arise in the building line. The diversity of design is almost unlimited. The machine is interchangeable to four, eight, ten and twelve inch widths. It is adjustable to sixteen lengths.

RAPIDITY: Upon the rapidity of a block machine depends in great part the profit on a contract. Speed is imperative So rapidly is this machine gotten ready for making and discharging blocks that it becomes simply a matter of human endurance as to number of blocks turned out.

SEND FOR CATALOG "A."

IDEAL CONCRETE MACHINERY COMPANY
STATION 21. SOUTH BEND, INDIANA.
"ON THE HIGH WAVE TO POPULARITY."

COPPER LIGHTNING RODS

ABSOLUTE PROTECTION from LIGHTNING is given by use of our continuous copper conductors.

E. G. Washburne & Co., 46 Cortlandt St., New York.
Telephone 3125 Cortlandt.

Work put up or material furnished.

THE IMPROVED Hand and Foot Power E. F. B.

SAWING MACHINE.

For Carpenters, Builders and All Wood Workers Who Have Shops Without Power.

SEND FOR CIRCULAR.

THE BARNES TOOL CO., New Haven, Conn.

Diamond Expansion Bolt.

Patented

For fastening fixtures, timbers, etc., to brick, stone concrete or other masonry.

DIAMOND EXPANSION BOLT CO.,
9-11-13-15 Murray Street, New York, N. Y

Suppose YOU Were Discharged?

Could you get another job? Would you have to take anything you could get, at whatever they would pay, and be glad to get that? Or do you possess the special training that qualifies you for a good position and a good salary wherever you go?

The value of a man's labor depends upon his knowledge of his trade. If YOU are held down to an inferior position by lack of such knowledge, your salvation lies in the coupon below. Mark it and mail it to the International Correspondence Schools, and they will tell you how they can provide you, in your spare time and without any conditions hard for you to meet, with the training that will enable you to command a good position at any time or place; and will secure for you a better position, increased earnings, and a happy future.

ISN'T SUCH AN OFFER WORTH INVESTIGATING?

INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 969, Scranton, Pa.

Please explain, without further obligation on my part, how I can qualify for a larger salary in the position before which I have marked **X**.

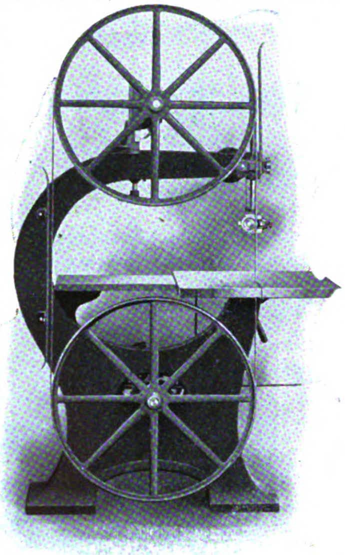
Architect
Architectural Drafts.
Building Inspector
Contractor and Builder
Structural Engineer
Mechanical Engineer
Mechanical Drafts.
Machine Designer
Electrical Engineer
Municipal Engineer
Heat. and Vent. Eng.
Chemist
Sheet-Metal Drafts.

Sanitary Engineer
Foreman Plumber
Electrician
Steam Engineer
Marine Engineer
Surveyor
Textile Expert
Bookkeeper
Stenographer
Ad Writer
French } With Edison Phonograph
German
Spanish

Name ______________________

St. & No. ______________________

City ______________ *State* ______________



The Rigid Construction and Modern Design of the New 36-inch CRESCENT BAND SAW insure a machine of the very highest efficiency as a rapid producer of accurate work.

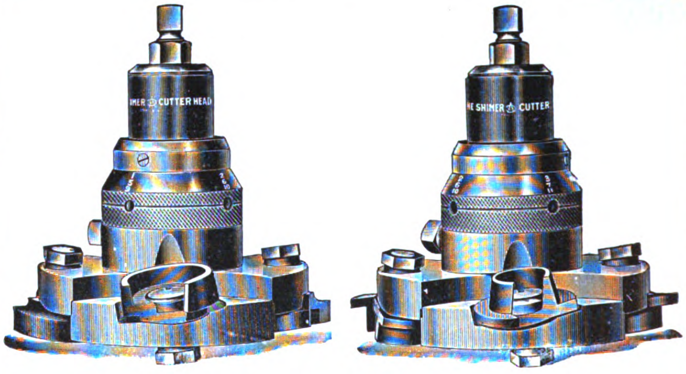
CRESCENT machines cost less than others of equal merit.

They are best because they are strong, durable and practical.

They are low in price because they are in big demand and we have to build them in large quantities.

Send at once for catalogue describing our complete line of BAND SAWS, SAW TABLES and JOINTERS.

THE CRESCENT MACHINE COMPANY, 206 Main Street, Leetonia, Ohio, U.S.A.



THE COMBINATION OF MECHANICAL PRINCIPLES FOUND IN

THE SHIMER CUTTER HEAD

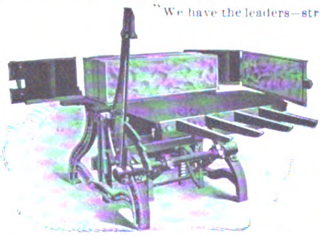
Has forced it to the front as a never-failing wood cutting tool to make single tongue and groove Flooring, Ceiling, Siding and Wainscoting.

It applies especially to the various patterns that come within the line of mill work where irregular and square offsets occur. We duplicate Cutters to the nicety and furnish at uniformly low prices. All kinds of knotty and cross-grained lumber is neatly and smoothly finished using faster feeds—reduced costs.

SAMUEL J. SHIMER & SONS, MILTON, PENNSYLVANIA

CONCRETE BLOCK, BRICK, POST and MIXING MACHINERY

"We have the leaders—strictly high grade"



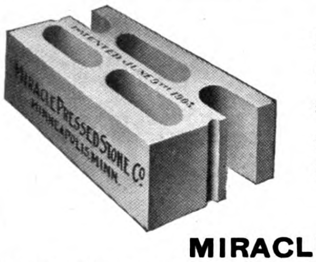
NORMANDIN BLOCK MACHINES

HIGHEST AWARDS

FAVORITE CONCRETE BRICK MACHINES

CEMENT MACHINERY CO., Hall Bldg., **Jackson, Mich.**

GREAT OPPORTUNITIES
IN THE MANUFACTURE OF
MIRACLE DOUBLE AIR SPACE CEMENT BLOCKS



We can equip you to defy competition and make enormous profits on a very little capital.

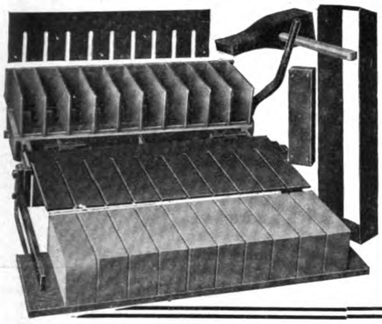
Begin making cement building blocks at once—this is the best time of the year. Make the Miracle Block if you would be the most successful.

Statistics show less failures among Miracle operators than among those making any other block.

The Miracle is the only block with sufficient merit to be fully and safely protected by U. S. Patents.

WE CAN GIVE YOU A LICENSE TO MANUFACTURE.
WE CAN GIVE YOU A MONOPOLY IF YOU WISH.
OUR LARGE 84 PAGE CATALOG R2 SENT FREE.

MIRACLE PRESSED STONE COMPANY
Eastern Branch: No. 1 Park Row, New York City. **MINNEAPOLIS, MINN.**



The Peerless Cement Brick Machine

A Simple One Man Machine made of Iron and Steel. Producing 10 perfect face or common brick at a time. Capacity, 3000 or more per day. Price Right. Send for Catalogue.

Peerless Brick Machine Co.,
10 Sixth St. North, Minneapolis, Minn.

ARCHITECTS! CONTRACTORS! BUILDERS!

When you want any STRUCTURAL WORK it will pay you to write to the

BOSTON BOLT COMPANY
ESTABLISHED 1872

Works, Offices and Salesroom
38-54 Farnsworth Street

Convertors of Iron and Steel into Bolts, Expansion Bolts, Nuts, and all kinds of Structural Work for Mills, Churches, Halls, Factories, Bridges, Wharves, Etc. and Iron Work of all kinds forged and made to order. *Send for catalog.*

JOHN W. CROOKS, Treasurer
BOSTON, MASS.

IMPORTANT.

A British firm, with extensive Joinery Department, fully equipped with modern Woodworking Machinery, is open to negotiate for manufacture and sale of high class Joinery, Cabinet Making, or Furniture specialties of any kind, either for British Market or for exportation. If desired, such arrangement will be made at present as will cover the eventuality of a tariff being imposed on manufactured imports sent into Britain.

Representatives in the principal towns in the United Kingdom.

For fuller particulars apply to JOINERY, care of

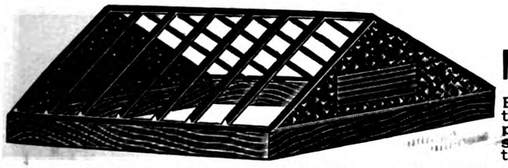
H. P. LANCASTER, Esq., Caxton House, London, S. W., England

DO YOU WANT THE BEST

DRAWING TABLE

made? If so send for illustrated catalogue and prices.

R. E. KIDDER,
22 Hermon Street, Worcester, Mass.



ART
METAL CEILINGS

Exclusive and Artistic Designs appropriate for any style of architecture.

All Styles Galvanized and Copper Skylights, Cornices, Finials, Crestings, Ventilators, Metal Shingles, Roof Gutters, all styles painted and galvanized Iron Roofing and Siding, etc. Write for Catalogue and Prices. Estimates free.

Kanneberg Roofing & Ceiling Co.,
Manufacturers,
CANTON, OHIO.

All Manner of Handy Rules for the Estimator are given in . . .

HODGSON'S

Estimating Frame and Brick Houses

ONE DOLLAR, POSTPAID.

DAVID WILLIAMS CO., 14-16 Park place, N. Y.

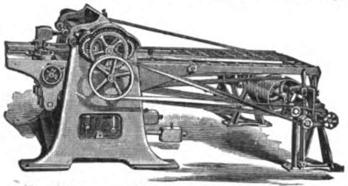
Digitized by Google Original from UNIVERSITY OF MICHIGAN

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

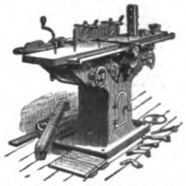
CORDESMAN, MEYER & CO., 26, 28 and 30 Central Avenue,
CINCINNATI, OHIO.

Manufacturers of Latest Improved

Wood-Working Machinery

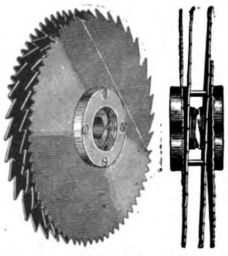


No. 2 Planer, Matcher and Moulder.



Universal Wood-Worker.

FOX



Adjustable Saw Dado Heads
The best thing for cutting grooves.

Fox Foot Power Miter Machines
The best thing for mitering mouldings and similar work.

We also make

Universal Trimmers,
Boring Machines, Lathes,
Planers, etc.

FOX MACHINE CO.
387 N. Front St., Grand Rapids, Mich.

The Edwards Metal Ceilings

Metal Shingles, Metal Windows, Cornices, Skylights, Roof Gutters, Corrugated Iron and Steel Roofing, Steel Imitation Brick and Stone Siding

Write for Metal Ceiling Catalog H and special proposition to agents.

Everything in Sheet Metal Building Material illustrated and described in our large 132 page Catalog L, sent free upon request.

The Edwards Manufacturing Co.
"THE SHEET METAL FOLKS"
Main Office and Works, 423 to 443 Eggleston Ave.,
CINCINNATI, OHIO.

Its application is very simple— no experienced help is needed. With every roll are included nails, tin caps and cement sufficient for the work. **RUBEROID** is so pliable that it fits anywhere.

THE well-told truth has for 13 years drawn builders' attention to **RUBEROID ROOFING**—demonstration of this truth has made its believers legion. **RUBEROID ROOFING** does all claimed for it. It *is* water and weather-proof. Its resistance to acids, gases, great heat and even fire is extraordinary. It will *not* melt, rot or crack. But "above all things" avoid imitations. Look for the registered trade mark "**RUBEROID**" always stamped on the under side. Send for samples.

MANUFACTURED SOLELY BY
THE STANDARD PAINT CO.,
100 William St., New York
CHICAGO OFFICES: 188-90 Madison St.

ALL KINDS OF
ELEVATOR CARS AND ENCLOSURES

Bank and Office Railing.

Send for Catalog.

FRED J. MEYERS MFG. CO.
HAMILTON, OHIO

We make Ceilings for churches, schools, stores, lodge rooms, court rooms, libraries, residences, etc.

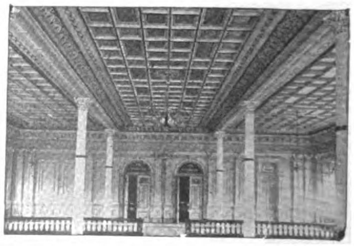
Our ceilings are shipped ready for erection. No expert labor required. Working drawings furnished. They're adapted to any kind of building. Exclusive in classified design.

Berger "CLASSIK"
Steel Ceilings

We also make Steel Roofing, Siding, Metal Shingles, Architectural Sheet Metal Work and Fireproofing Material.

Our catalogues sent you free. Ask for them.

THE BERGER MFG. CO.
CANTON, OHIO.
New York. Boston. Phila. St. Louis



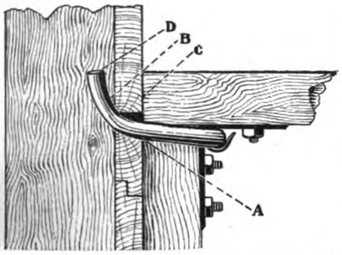
Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

"AMERICAN" Polygon Conductor Pipe

Can be furnished in either Galvanized Iron or Copper. It is made from galvanized iron in 10-ft. lengths, without a cross seam; from copper in 8-ft. lengths.

American Rolling Mill Co., MIDDLETOWN, OHIO.

Every Carpenter Appreciates Labor Saving Devices



Write for Circular of our

BRACKET HANGER

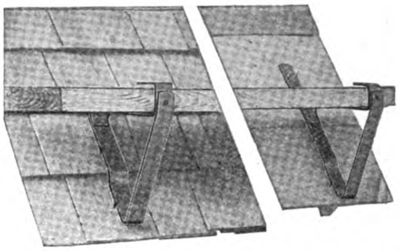
AND

ROOF BRACKET

25 000

Have Been Put in Use Last Year

Satisfaction Guaranteed



WAGNER MANUFACTURING CO., Dept. F. **Cedar Falls, Iowa.**

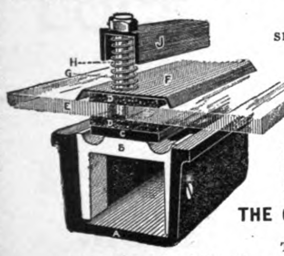
To Make Money From Your Invention

it must be protected by such a PATENT as will enable you to completely MONOPOLIZE it and control infringers. I procure patents that stand the test of competition at a cost probably nowhere near as high as you may think. The patent law favors the DILIGENT, not the indolent, inventor, so send me TO-DAY a sketch or model, and explanation of your invention and I will furnish full advice. To morrow, next week, or next month may be too late. References on request.

GEO. R. HAMLIN, Patent Lawyer, 800 H Street, N. W., Washington, D. C.

CORRUGATED IRON Painted and Galvanized. **SCOTT & CO.,** Cincinnati, O. Agents Wanted **IRON ROOFING** Painted and Galvanized.

THE "ANTI-PLUVIUS" SKYLIGHT



Absolutely and permanently impervious to rain, snow, sleet or dust without putty or cement. With bridge arrangement for walking on the skylight without danger of breaking the glass. Specially adapted for large buildings and shops where there is always more or less vibration.

A—Steel Supporting Bar.
B—Mall. Iron Bridge.
C—Flat Iron.
D—Felt.
E—Glass.
F—Copper Sheet Cap
G—Coil Galv. Brass Spring.
H—Galv. Brass Stud.
J—Bridge (for walking on skylight).

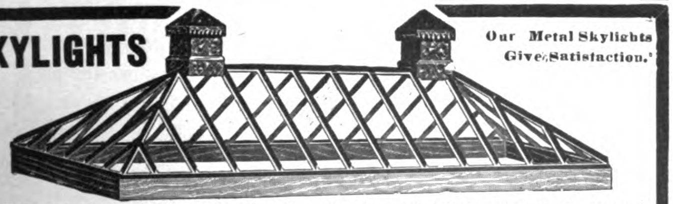
THE G. DROUVÉ CO., Bridgeport, Conn., U. S. A.

Also Manufacturers and Erectors of THE LOVELL WINDOW OPERATING DEVICE.

Inquiries Solicited and Estimates Cheerfully Furnished.

SKYLIGHTS

Our Metal Skylights Give Satisfaction.



They are so constructed that all condensation is carried to the curb and discharged through weep holes on to the roof without soaking between laps.

The peculiar construction of the curb on our skylights renders counterflashing unnecessary.

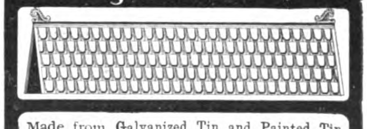
Frames of galvanized iron or copper, with glass of any kind or thickness.

Write for our New Cornice, Skylight and Ornament Catalog.

THE CANTON STEEL ROOFING CO., Canton, Ohio

WALTERS'

Shingles that last



Made from Galvanized Tin and Painted Tin

STORM, RUST AND FIRE PROOF

Do you want to increase your business? THIS IS YOUR OPPORTUNITY. Write for catalogue, samples and prices.

National Sheet Metal Roofing Co.,
JERSEY CITY, N. J.

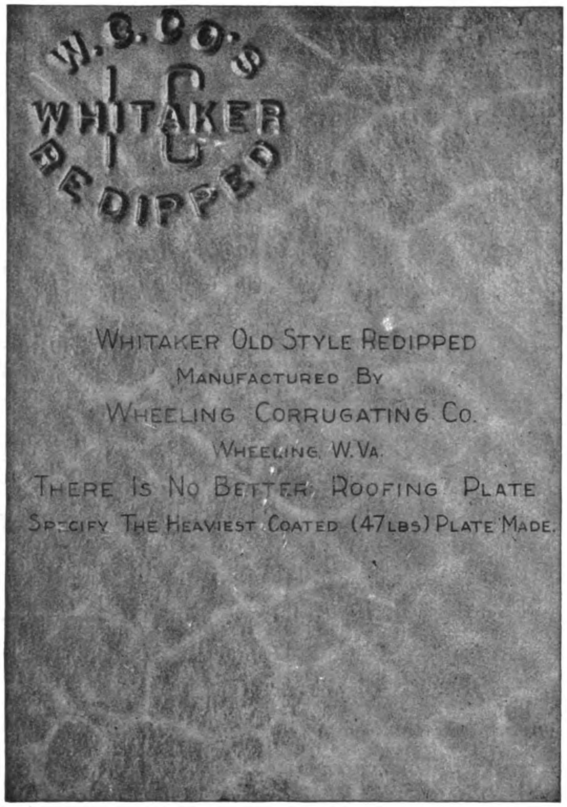
"STAR ENCAUSTIC TILE CO.,"

MANUFACTURERS OF

Superior Unglazed Encaustic Tile

For Floors in Stores, Churches, Depots, Kitchens, Halls, Porches, &c.

Office and Factory, Bluff Street, near Gist.
PITTSBURG, PA.



ALWAYS IN THE FRONT RANK AND LEADING

Whitaker Old Style Roofing Plates

The Whitaker Old Style Redipped is made by the Palm Oil Process from perfect, carefully annealed black plate, and carries 47 pounds coating of pure tin and new lead to the 20x28 box; weighs net—IC 253 pounds; IX 312 pounds. Every sheet is resquared, inspected and packed with our guarantee. There can be no better Roofing Plate made.

SAMPLE SENT POSTPAID ON REQUEST.

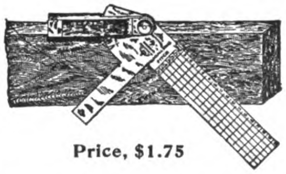
We carry full stock in all our warehouses.

BRANCH OFFICES AND WAREHOUSES:

NEW YORK CITY	47-51 Cliff Street
CHICAGO	23-27 North Clinton Street
ST. LOUIS	112-114-116 South Eighth Street
PHILADELPHIA	402-404-406 Race Street
BOSTON, MASS.	132 and 134 Pearl Street
CHATTANOOGA, TENN.	King Street

NO MATTER
WHAT KIND OF METAL ROOFING
YOU WANT,
WE MAKE IT—WRITE TO US.

No Order Too Large For Us.



Price, $1.75

TOPP'S FRAMING TOOL.

A PERFECT TOOL and the only Tool for the purpose ever invented.

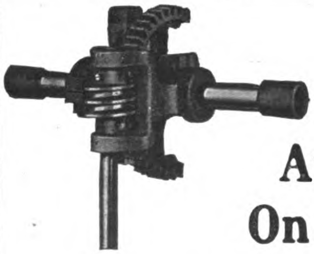
Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

Write for booklet. Address the manufacturers,

G. A. TOPP & CO., - Indianapolis, Ind.

SECURE
PROTECTION AND LONG
SERVICE BY USING OUR
ASPHALT ROOFING
SAVES REPAIRS
SAVES RECOATING
SAVES RENEWING
Send for Samples and Pamphlet
STOWELL MFG. CO.
JERSEY CITY, N.J.



Another Hint On Ventilation.

Let's take it for granted you want to operate runs of sash in a monitor: How shall you place the operating rod? With our device, place it anywhere. Bring it down the post or carried along the roof line and down the side. This gear will do the work from anywhere at any time.

Catalogue X-V.

LORD & BURNHAM CO.
1133 Broadway, cor. 26th St., New York.
Boston Branch: 819 Tremont Building

We Give Particular Attention To Special Designs

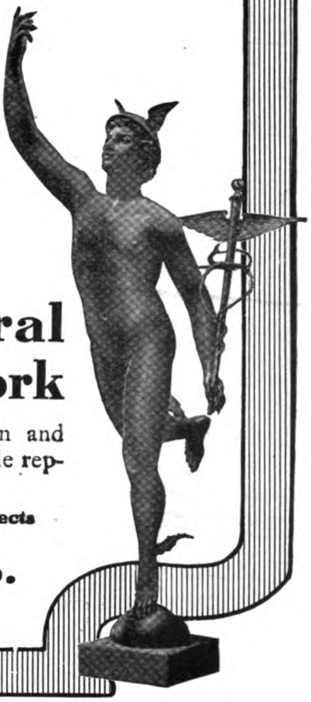
and are fully equipped to execute the most intricate and delicate work ever attempted in sheet metal.

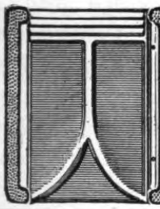
Mullins
Art Architectural Sheet Metal Work

is far in advance in architectural design and artistic execution and has won an enviable reputation for excellence.

Estimates, Designs, etc., submitted to architects builders and contractors on request.

The W. H. Mullins Co.
208 Franklin St., Salem, Ohio.
(Everything in sheet metal.)

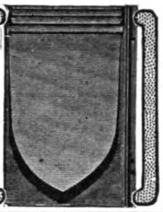




CORTRIGHT METAL SHINGLES

Who can drive a nail better than a carpenter? Then who has a better right to make money laying Cortright Shingles?

CORTRIGHT METAL ROOFING CO.
Philadelphia and Chicago



LOCK-JOINT METAL CEILINGS

are every day proving their superiority over the ordinary Lap Joint Ceiling.

Send for Catalogue "D"

S. Keighley Metal Ceiling & Mfg. Co.
PITTSBURGH, PA.

Brooklyn, N. Y. Washington, D. C.
Baltimore, Md. Boston Mass.

PLUMBERS' SUPPLIES
AT WHOLESALE.

If you need anything in my line, and wish to **SAVE 20 to 40 Per Cent** on every article, write for my free illustrated Catalog. Shipments promptly made from a very complete stock of guaranteed goods. Small orders are as carefully handled as large ones.

B. C. KAROL, 235 W. Harrison St., Chicago, Ill.

TOP IT OFF

With our

No. 76 Cresting

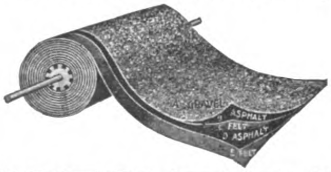
and be proud of your roof finish. Send for catalog No. 5 showing a very complete line of architectural metal work.

STEEL CEILING is a leading feature with us.

We make the W. H Miller Patent Metal Window Frames and Sash. Special catalog on these. Originators of the hip shingles.

WILLIS MFG. CO., - - Galesburg, Ill.

A Built-Up Gravel Roof Ready To Lay.



"SECURITY"

(Registered U. S. Patent Office.)
Note the Patent 6 inch Joint.

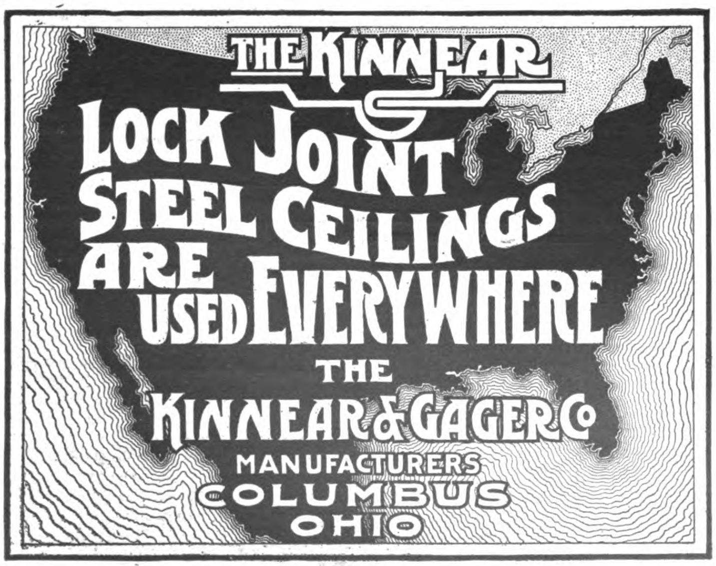
The National Roofing Company
TONAWANDA, N. Y.

Combines durability, low price, ease of application, fire-proof qualities and sightliness, just what the buyer of roofing material demands.

The cheapest way to repair old shingle roofs is to cover with **PERFECTED GRANITE ROOFING.**

SEND FOR PHOTO PAMPHLET.

Eastern Granite Roofing Co., Irving Building, New York.



THE FOURTEENTH
EDITION OF

Kidder's
Architects'
and
Builders'
Pocket-Book

Except for two or three chapters this book has been entirely rewritten and is thoroughly up to date. It now numbers 1675 pages and contains upwards of 1000 engravings. This is unquestionably the most complete hand-book in the English Language treating on Building Construction and Structural Engineering, and contains a vast amount of practical and reliable data relating to Builders' work. The subject of reinforced concrete is fully considered and formulas given for strength, etc.

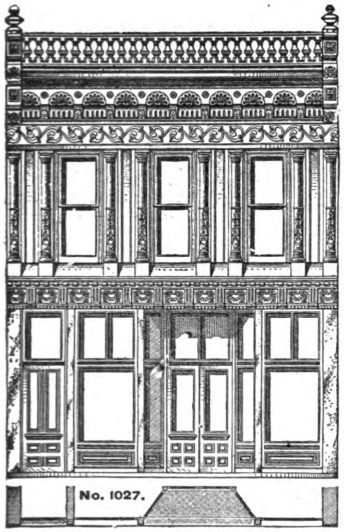
No Architect, Structural Engineer, Contractor or Draughtsman can afford to be without it.

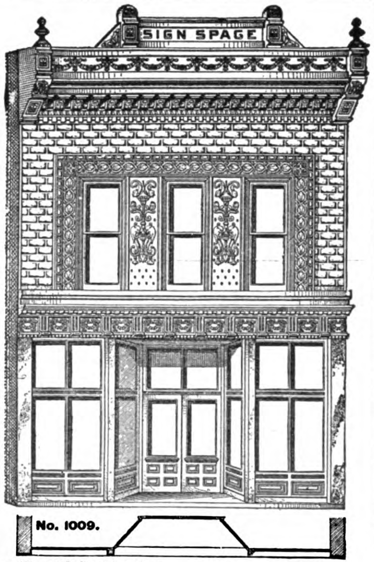
Circular giving table of contents and sample pages mailed on request.

Twentieth Thousand.
1656 pages, 1000 figures.
Morocco, $5.00.

DAVID WILLIAMS CO.
14-16 Park Place, New York.

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google
Digitized by Google
Original from UNIVERSITY OF MICHIGAN


No. 1027.



No. 1009.

25 feet wide—lower ceiling 12 feet in clear.

Net price F. O. B.	St. Louis, Mo.	$209.00	Net price F. O. B.	St. Louis, Mo.	$187.00
" "	New York, N. Y.	238.00	" "	New York, N. Y.	212.00
" "	St. Paul, Minn.	229.00	" "	St. Paul, Minn.	204.00
" "	Denver, Colo.	268.00	" "	Denver, Colo.	239.00
" "	Dallas, Tex.	253.00	" "	Dallas, Tex.	225.00

Galvanized Sheet Steel Fronts

The designs presented herewith illustrate our complete and modern store fronts. The prices include the steel sill course, steel vestibule plate, steel angle columns for covering end walls, steel intermediate box columns; show sash, store doors, transoms, door posts, box window frames with sash of white pine 1¾ in. thick; all glass for same of double strength; galvanized iron work above first-story columns.

We make and ship over 800 fronts annually from 20 to 300 feet in width and from one to five stories high. Having given the manufacture of complete fronts our most careful study for over thirty years, they are now the best, cheapest and most elaborate in the market. Owing to their simple and practical construction, any mechanic, whether experienced in this particular line or not, can erect them, aided by a set of full-size details and instructions that we furnish. We desire to introduce this class of work in every city in the United States, and solicit the correspondence of architects, builders and others contemplating the erection of buildings. Send for references, full descriptive catalogue and discounts. **Established 1846.**

MESKER & BROTHER,

421-519 S. SIXTH STREET - - - ST. LOUIS, MO. U. S. A.

THE NEW YORK STEEL CORNER PLATE CO.

—SUPPLY—

The Parker Steel Corner Bead for the Protection of Plastered Corners

Outlines a perfect corner. The best Corner Bead in the market. Fits any ground.

Endorsed by Leading Architects, Builders and Plasterers.

Telephone
876 Madison Square.

All communications
to 1135 B'way, N. Y. C.

If the skies rained oil, paint would never "chalk." Chalking paint is absorbent paint, and as the skies rain water and not oil absorbent paint does not protect the surface under it.

Chalking is prevented by the addition of OXIDE OF ZINC—combination paints based on OXIDE OF ZINC do not become "chalky" or absorbent neither do they discolor and, furthermore, they are very durable and economical.

FREE
Our Practical Pamphlets:
"The Paint Question."
"Paints in Architecture."
"Paint: Why, How and When?"
"French Government Decrees."
"Specifications for Architects."

THE NEW JERSEY ZINC CO.,
71 Broadway, - - New York

We do not grind zinc in oil. A list of manufacturers of Zinc White Paints will be furnished on application.

PRODUCERS OF

ROOFING SLATE

SLATE BLACKBOARDS.

THE E. J. JOHNSON CO.
38 Park Row,
New York.

Quotations delivered anywhere.

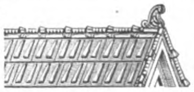
Slaters' Supplies, Snow Guards.

Write for Price Book

MONTROSS METAL SHINGLES

Are money makers for up-to-date carpenters. We want some one to lay them in your territory. If you want the work—write

Montross Metal Shingle Co., Camden, N. J.



8 x 10 inch

BLUE PRINTS

Of 250 Buffalo, N. Y., Residences

In stone, stone and frame, brick, brick and frame, etc., mailed postpaid to any address at $1.00 per dozen.

Send for catalogue and sample blue print free.

HENRY FRED SCHMUL
ARCHITECT
NIAGARA FALLS, N. Y.

Useful Pamphlets

At 25 Cents Each

POSTPAID

Practical Hints on Joint Wiping.
For Beginners in Plumbing. Sixth Edition, enlarged, 66 pages, 41 illustrations. 5½ x 8 inches .25

House Chimneys.
A Series of Articles and Letters on Chimney Troubles and their Remedies. 62 pages, 40 illustrations. 5½ x 8 inches .25

Domestic Electrical Work.
Concise and Practical Explanations on Wiring Buildings for Bells, Alarms, Annunciators and for Gas Lighting from Batteries. By W. A. WITTBECKER. 55 pages, illustrated. 5½ x 8 inches .25

Reading Architects' Drawings.
Practical Suggestions for young Mechanics. 29 pages, illustrated. 5½ x 8 inches .25

Guide to Bronzing and Enamelling.
Treating Liquids, Enamel Paints, etc. 37 pages. 5½ x 7 inches .25

The Preparation and Use of Cements, Glue and Paste. 177 receipts. 58 pages. 5 x 7¼ inches .25

How to Become a Good Mechanic.
A Practical Guide to Self-Taught Men; Telling what to Study; How to Begin; What Difficulties will be Met and How to Overcome Them, &c. 68 pages. 5 x 7 inches .25

Easy Lessons in Roof Measurements.
Twelve Short Lessons in Figuring from Architects' or Scale Drawings, the Amount of Material Required to Cover a Given Surface in Flat, Hipped or Irregular Shaped Roofs. 81 pages, 12 illustrations. 5½ x 8 inches .25

Blue Print Making.
Embracing Directions for Constructing the Printing Frame, Preparing the Paper, and Making Prints of Various Kinds. 28 pages. 5½ x 8 inches .25

David Williams Company
PUBLISHERS
14-16 Park Place.
NEW YORK.

Digitized by Google

Original from
UNIVERSITY OF MICHIGAN

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

BUY . . . .
LUMBER
DIRECT

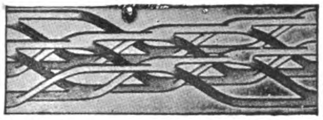
WE MANUFACTURE ALL KINDS.—MOULDINGS, WINDOWS, DOORS, BLINDS. MIXED CARS, INCLUDING EVERYTHING FOR A BUILDING. STRAIGHT CAR-LOADS SHINGLES, SIDING, FLOORING, WHITE PINE, AT WHOLESALE PRICE.

"Our complete Catalog and Price List of all kinds of Building Material would be a great help to you in figuring."

LESTERSHIRE LUMBER & BOX CO., LESTERSHIRE & BINGHAMTON, NEW YORK.

Kuhne's Truss Metal Lath and Structural Element

Steel Concrete



Best Concrete Binder, Self-centering—For General Fire-Proof Constructions, such as Partitions, Floors, Stairs, Outside Walls, Roofs, Sidewalks, Sewers, Tanks, etc. Patented January 1, 1901.

(CATALOGUES ON APPLICATION.)

TRUSS METAL LATH CO., 15-25 Whitehall St., New York City
MANUFACTURING AND SALES DEPARTMENT:
GOFF, HORNER & CO., LIMITED, Frick Building, Pittsburgh, Pa.
MILLS AT ZANESVILLE, OHIO.

Dexter Portland Cement.

DEXTER PORTLAND CEMENT CO. FINENESS STRENGTH TRADE MARK PORTLAND UNIFORMITY SAMUEL H. FRENCH & CO. SOLE AGENTS PHILA. NAZARETH, PA.

HIGHEST STANDARD ATTAINABLE FOR PAVEMENT AND CONCRETE WORK.

SAMUEL H. FRENCH & CO.,
Sole Agents,
PHILADELPHIA.

Established 1844.

THE "GLOBE" VENTILATOR

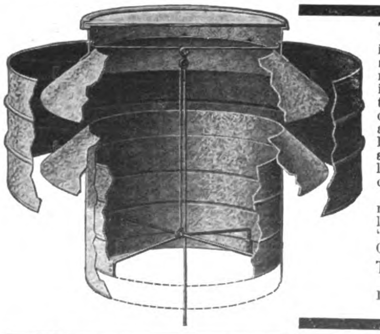
In Brass, Copper, Galvanized Iron and with Glass Tops for Skylight Purposes. Also

"Globe Ventilated Ridging"

For Barns, Residences and Buildings of every character. Far superior to a Cupola.

Send for Description and Price List.

Manufactured by GLOBE VENTILATOR CO. Troy, N.Y.



THE "BURT" VENTILATOR

is no experiment; has been on the market nearly 5 years; is used by the most prominent concerns in the Country. The "Burt" is the only Ventilator on the market with the sliding sleeve damper (patented). This damper is ideal where glass tops are used, as the ventilator can be closed, yet the skylight feature is never affected—always free and open. The temperature can be regulated better, damper never moves and never collects dust.

Before purchasing a ventilator of any make, send for our finely illustrated booklet describing in detail our claims for the "Burt" MADE IN ALL SIZES, BOTH GLASS AND METAL TOPS.

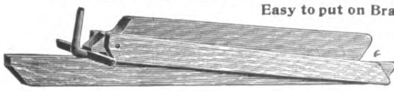
THE BURT MANUFACTURING CO.
301 Main Street, Akron, Ohio, U.S.A.
Largest Manufacturers of Oil Filters and Exhaust Heads in the World.

JACKSON'S SCAFFOLD BRACKET HOOK

The Simplest, Strongest and Cheapest Device made for Holding up Scaffolding. Hook is ten inches long, made of best malleable iron, and saves its cost many times over in one season's work.

Easy to put on Bracket. Easy to put Bracket on Building.

No wiggling or falling scaffolds where this hook is used. *Write for Circulars.* Sold to builders with or without the folding brackets.



BRACKET HOOK CO.,
119 N. Winnebago Street, Rockford, Ill.

All phases of Plumbing, Drainage and Water Supply are expertly treated in the new book

Plumbing and House Drainage Problems.

THE SIXTH EDITION REVISED AND ENLARGED.
309 Pages, 197 Illustrations. TWO DOLLARS, PREPAID.

DAVID WILLIAMS COMPANY 14-16 Park Place, New York.

Furnace Heating

is from the hand of an expert in that kind of work. From a man widely experienced in the practice, and competent to present a clear practical treatment on the introduction of warm air apparatus into different buildings, on a scientific and economical basis.

The furnace man, the builder, the owner, who seeks solution of problems attending the designing and laying out of furnace work, may be safely governed by the rules and data here laid down.

He will find a discussion of:—

The types of furnaces and their efficiency.
The comparative merits of furnace and other systems.
The combination system.
The introduction of air and ventilation.
Heating and ventilating School Buildings, Public Buildings, Churches and Stores.
The Fan Furnace Combination System.
Temperature Control.
Estimates and Contracts.
Fuels, with Tables and Data.
And an appendix on Furnace Fittings.

By William G. Snow

170 Pages 90 Illustrations
$1 50 Postpaid

DAVID WILLIAMS CO.
Publishers
14-16 Park Place, N.Y.

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

(ELECTRIC)

STORE ELEVATOR FOR 105

COMPLETE, READY TO ERECT, MADE BY THE HUNDRED. SIMPLE IN CONSTRUCTION. EASILY CARED FOR. OTHER STYLES AND PRICES TO SUIT.

The Warner Elevator Mfg. Co. 2100 Valley St. CINCINNATI, O.
NEW YORK OFFICE: 2032 PARK ROW BLDG.

MORSE DUMB WAITERS and HAND ELEVATORS

Dependable Durable Light Running

Furnished with or without lumber. Shipped with all necessary drawings and direct'ons for setting up. Write us. All particulars free. . . . .

MORSE, WILLIAMS & COMPANY
PHILADELPHIA ATLANTA BOSTON

The New Book by F. E. Kidder

Strength of Beams, Floors and Roofs

is prepared especially for carpenters, draughtsmen and architects

WHO HAVE NOT HAD THE ADVANTAGE OF A TECHNICAL EDUCATION. : : :

The rules given for the strength of beams and floors are very simple and practical, requiring for their application no higher knowledge than that of simple arithmetic.

The mechanical principles of the ordinary types of trusses are fully and clearly explained, and also the methods of computing the stresses and proportioning the members.

THE CHAPTER ON TRUSS JOINTS IS OF SPECIAL INTEREST : :

230 Pages TWO DOLLARS, PREPAID 164 Engravings

DAVID WILLIAMS COMPANY, Publishers
14-16 Park Place : : : · New York

DUMB WAITERS AND HAND ELEVATORS,

Trunk Lifts,
Invalid Lifts,
Carriage Elevators,
Freight Elevators,
Sidewalk Elevators,
Hatchway Hoists.

All of most improved design and construction.

Sedgwick Machine Wks.,
88 Carroll Street,
POUGHKEEPSIE, N. Y.
New York Salesroom, 128 Liberty St.

Catalogue on application.
Estimates on request.

Improved Quick and Easy Rising Steam, Electric and Hand Power Safety

ELEVATORS

AND DUMB WAITERS.

Automatic Hatch Gates.
Send for Circulars.

KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kimball Elevator Co., Cleveland, Ohio, 245 Vincent St
Branch Offices:
120 Cedar St., New York. 108 11th St., Omaha, Neb

ELEVATORS AND DUMBWAITERS

that can be placed in position by any carpenter.
Catalogue Free.

Energy Elevator Co.
407 Cherry St., - Phila., Pa.

Notice Carpenters ! ! !

The second edition of **The Lightning Estimator**, the book that has had such a remarkable sale in the last year, at 50c a copy has been exhausted.

We have ready the third edition greatly improved and one-third larger, which will sell for the low price of 60c (Money order). Simple, rapid, practical, accurate, reliable.

Prepared by a prominent builder.

Based on records of actual construction, not theory.

A $2,000 house estimated in 30 minutes.

Third Edition 60c, Write now.

BRADT PUBLISHING CO.,
JACKSON, MICH. 260 Michigan Ave

GET Grinnell's Estimator and Builders' Pocket Companion. Keep it one week and if not satisfied return it in good condition and we will refund your money. Send $1.00 by money order to

GRINNELL PUBLISHING CO.,
213 B Law Exchange Building,
BUFFALO, N. Y.

—TEACHER: "We should never do in private what we would not do in public."

L'enfant Terrible: "How 'bout taking a bath?"—*Exchange.*

LOOK OVER THE SIMONDS SAWS, and you will see the points of advantage.

FIRSTLY, they are ground a true taper, which enables the user to run the Saw with very little set.
SECONDLY, each Simonds Saw is handled by a mechanic who thoroughly understands the hanging of the Saw, which guarantees this most important feature.
THIRDLY, the filing and setting of the Simonds Saws are carefully done, and thoroughly inspected, so that the Saws, on leaving the factory, are ready for work.
FOURTHLY, the steel used in the manufacture of the Simonds Saws is a high carbon crucible steel, and will hold its cutting edge much longer than the ordinary steel generally used.
FIFTHLY, each Saw is put up in a separate case, thus avoiding fingering and rust marks commonly found on Saws that are not encased properly.
SIXTHLY, because every Simonds Saw is guaranteed thoroughly.

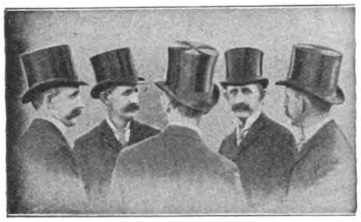
Any mechanic trying a Simonds Saw, and not finding same satisfactory, may return the Saw, either to the dealer or to the Simonds Mfg Co., and get either a new Saw or money paid back.

SEND FOR CATALOGUE AND PRICE LIST.

SIMONDS MFG. CO.,

Fitchburg, Mass. Chicago, Ill. New York, N.Y.
Portland, Ore. Seattle, Wash.
SIMONDS MFG. CO., Ltd., New Orleans, La.
SIMONDS SAW CO., San Francisco, Cal.

STANDARD MINERAL WOOL



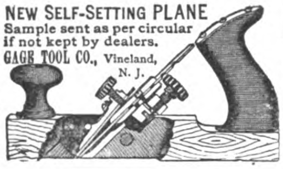
LOOKING ALL WAYS FOR BUSINESS
COLUMBIA MINERAL WOOL CO.,
Room 918, 112 Clark St. CHICAGO.
Samples and Circulars Free

Fireplace Mantels
MADE OF
Ornamental Brick
$12 and up.

Last longest—look best—are not too costly. There's no other kind so good—so pleasing. Our Sketch Book tells all about them. Write for it.

PHILA. & BOSTON FACE BRICK CO. - P. O. Box 8613 - BOSTON, MASS.

Irons warranted: Plane is returned money refunded.



NEW SELF-SETTING PLANE
Sample sent as per circular if not kept by dealers.
GAGE TOOL CO., Vineland, N. J.

MILLER'S HAND MORTISER

For Mortise Locks. Time Per Door, Three Minutes

Sold on Trial for $12.00
$4.00 with order, balance in thirty days.
ALBERT W. MILLER MFG. CO.
Cincinnati, Ohio, and Riverside, Cal.

OUR FINE HARDWOOD FLOORING
SHOULD BE THE BEST.

We have been making PARQUETRY for TWENTY YEARS. We have our own saw mill and timber tracts and two factories. Send for our trade discounts and our Design Book No. 5.

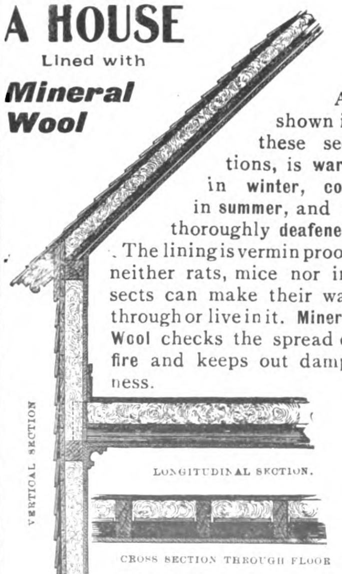
WOOD-MOSAIC FLOORING CO.
ROCHESTER, N. Y. NEW ALBANY, IND.

Bolcoa
TRADE MARK
ETCHING FLUID

Will mark your tools in a manner impossible to erase, without destroying the article itself. Protect yourself against loss and theft. Easy of application. **Price 25 cents.** We handle a full line of tools. Let us know your wants.

Reed & Auerbacher Co.
229 Bowery, N. Y.

A HOUSE
Lined with
Mineral Wool



As shown in these sections, is warm in winter, cool in summer, and is thoroughly deafened. The lining is vermin proof; neither rats, mice nor insects can make their way through or live in it. Mineral Wool checks the spread of fire and keeps out dampness.

Sample and Circular Free.
U. S. MINERAL WOOL CO.,
143 Liberty St., New York.

The Boynton Furnace Co.
SOLE MFRS. OF
Boynton's Furnaces, Ranges, Hot Water Heaters, Steam Heaters, Etc.

207-9 Water Street, New York.
147-9 Lake Street, Chicago.

—"HAVE taxpayers no rights?" demanded the impassioned orator.

"Certainly," replied a man in the back row. "They have the right to pay taxes."
—*Exchange.*

EVERY Builder who reads, investigates and progresses will have a copy of Kidder's Strength of Beams, Floors and Roofs. $2.00 prepaid.
DAVID WILLIAMS CO. 14-16 Park Place, N. Y.

Carpentry and Building

NEW YORK, JUNE, 1906.

The San Francisco Disaster and the Present Building Situation

WHAT our special correspondent, who was a witness to the terrible conflagration which wiped out the greater portion of the city of San Francisco, has to say concerning the disastrous event of the third week in April and of the present building situation as it there exists, will, we feel sure, be read with more than usual interest by every patron of this journal. There are many lessons to be drawn from a calamity such as this, and while the city may, by reason of the tremendous property losses entailed, be somewhat slow in recovering from the shock, yet it has been the means of demonstrating in a most striking manner the soundness of the principles on which modern fire and earthquake proof construction is based. At the same time it has carried significant suggestions which municipal authorities throughout the land should not allow to pass unheeded. One very serious inconvenience experienced is the extensive derangement of business arising from the disaster, but, judging from the admirable attitude displayed by the citizens under most trying circumstances, they will in due course recover from their troubles and a new city will rise from the ashes of the old, more beautiful and more substantial than the one destroyed.

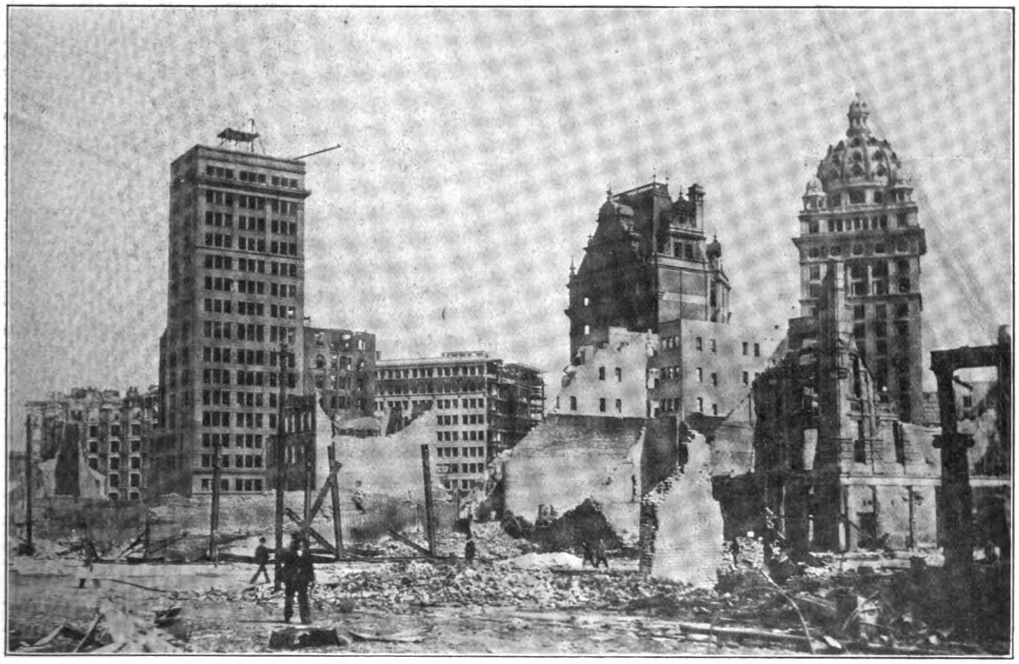


Fig. 1.—View of Ruins, Showing Some of the Steel Frame Buildings That Stood the Test of Earthquake and Fire.

The San Francisco Disaster and the Present Building Situation.

Our correspondent, writing under date of May 7, describes the situation as follows:

The great fire which followed the disastrous earthquake shock at 5.15 a.m., Wednesday, April, 18, made almost clean sweep of the heavy wholesale and manufacturing districts of the city during the morning of that day. In the afternoon and evening the central business district and practically all of the large office structures and leading hotels were burned out, leaving only shells. Contrary to many misleading reports sent out by interested or misinformed persons the earthquake caused directly only a comparatively small portion of the immense damage inflicted during the three days of the catastrophe. The fact that the principal water mains were broken by the first earthquake shock and that many gas pipes were ruptured soon resulted in a number of fires that raged until they burned out, checked by dynamiting buildings or by back firing. It should be stated that very little damage was done by any of the succeeding slight shocks of earthquake, which continued at intervals of a day or two for more than two weeks. The heavy steel frame buildings of comparatively recent construction as a rule admirably withstood both earthquake and fire.

The Palace Hotel, which was among the first of the buildings to use iron in its construction was designed to be both fire and earthquake proof. The earthquake test was successfully passed. Not a square of glass fell from the glass roof of the immense court, and guests were breakfasting in the grill room when the second shock, about 8.30, drove out the timid ones. The hotel management soon ordered the guests to leave, as the fire was approaching rapidly and all of the hotels east of Kearny street were closed.

The Rialto and Crossley buildings on New Montgomery street, south of the Palace, were burned early in the afternoon, along with the new executive office

building of the Pacific States Telephone Company. These three buildings were the main center of the electrical supply district of the city. The Grand Hotel took fire about the same time, but it was late in the afternoon before the Palace, one of the best known and most handsomely appointed in the world, succumbed to the flames. It burned very gradually and seemed to come fully up to the standard of the latest type of "slow burning" construction. With the hundreds of bay windows burned off, the ruins presented a peculiarly desolate appearance. The grand court, with its famous palm garden, presented a vast picture of desolation. About noon the Claus Spreckels Building, commonly known as the *Call* Building, had fallen a victim to the fire that had been steadily encroaching, as there was no water available. Great crowds watched the flames creep up from floor to floor until before 2 o'clock fiery banners were pouring from the circular windows in the lofty dome of the tallest building in the city.

The Hearst Building, occupied by the *Examiner* office, was next attacked, and in spite of every effort made by the fire fighters the upper floors caught and made a spectacular blaze. The greater part of the walls remained standing, but were later thrown down by dynamite. Attempts were made to dynamite the nearly completed Monadnock Building on Market street, just east of the *Examiner*. The attempts were unsuccessful, and the building will be restored and completed within a reasonable time. During the afternoon the fire worked its way up the south side of Market street despite the desperate efforts of the dynamite squad. Earlier in the day the big fire which had been devastating the entire district south of Market street, including tenement houses, stores, shops and churches, had burned the Mechanics' Pavilion, an immense wooding building, and the great brick buildings of St. Ignatius Church and College, and was coming back toward the intersection of McAllister street and Van Ness avenue. It burned right up to the old Mercantile Library Building at the corner of Van Ness and Golden Gate avenues, and was checked there for a while.

During the evening a new fire was started by the overtruning of a lamp in the Alcazar Theater on O'Farrell street, near Powell. Owing to lack of water, this fire spread with great rapidity up the long rows of apartment houses on O'Farrell and Ellis streets, where there were many frame buildings, and also circled around through the business district north of Market, which had so far remained intact. It worked back from the Alcazar into the big Cordes furniture store. and soon the entire south side of Union square was involved. The great James Flood Building, at the corner of Market and Powell streets, and the adjacent smaller buildings were burned that night. The *Chronicle* Buildings, old and new, the Crocker Building and the Mills Building were involved, and the new St. Francis Hotel burned before morning came. The ruin of the grandly beautiful City Hall, which cost $6,000,000 and contained the public library, was completed by the fire.

Further northward the fire had extended along the Kearny street shopping district, taking in the Hall of Justice, that had sustained considerable earthquake damage, and had communicated to Chinatown, which soon became a raging furnace. The storm of fire then swept up the hills until the new Fairmont Hotel, the pride of the city, occupying its most conspicuous location, was wrapped in flames. Many persons, who had thought that the commanding hight of its location and the small amount of inflammable material in the building would save it, lost hope that any portion of the city would be saved. The next day, Thursday, it was found that the hotel could be restored, although the expense would be heavy. White terra cotta and granite were used in the construction of the Fairmont, which was not very seriously damaged by the earthquake. On Thursday and Friday the district west from Powell street to Van Ness avenue, containing thousands of homes and including the prosperous business districts along Polk and Larkin streets, were wiped out completely by the fire. The foreign quarter, between Dupont street and Hyde street, extending out from Chinatown to North Beach, was also completely devastated, and the fire burned itself out in the North End lumber yards on Saturday.

As soon as the ruins were cold in a few spots the work of cleaning away debris and reconstruction com-

Fig. 2.—View Looking East on California Street from Kearny Street, Showing Old and New Types of Buildings.

The San Francisco Disaster and the Present Building Situation.

menced. It was decided to facilitate the resumption of business by allowing the erection of one-story temporary structures of frame and corrugated iron anywhere with the understanding that they were to be removed upon the order of the city authorities after a reasonable length of time. Many of these temporary buildings have been erected, and a few weeks will see thousands under way. A set of temporary regulations for the erection of buildings has been issued by the city authorities and are given below. Contracts have been let for the construction of a number of tall buildings, but it is not yet known what the permanent provisions of the new building laws will be as to the maximum number of stories that will be permitted for new structures. It will take several months to clear away the debris by the use of steam cars on the railroad lines, which have been laid through the principal streets to facilitate reconstruction in the burned district, comprising 16 square miles.

Fig. 3.—Ruins of Golden Gate Hall, a Fine Specimen of Pressed Brick and Terra Cotta Construction.—Most of the Damage Was Caused by Fire, the Structure Having Withstood Comparatively Well the Earthquake Shock

The San Francisco Disaster and the Present Building Situation.

Although perhaps three-fourths of the valuation of buildings in the city was destroyed, there is still a large area covered with residences remaining in the territory west of Van Ness avenue and in the western additions. There is also a large residence district in the "Mission," with a number of business houses that were saved from the fire. The three largest iron works in the city were saved, along with the principal wharves and railroad terminals. There is also a fringe of business houses extending west on Union street from Van Ness avenue to Fillmore street, and also along Fillmore and Devisadero streets. Fillmore street is now the business center. Although a good deal of business is expected to find its way back to the old locations downtown, there is a possibility that the retail shopping district will be established and much of it will remain permanently on or near Van Ness avenue.

As soon as insurance payments are made the building boom will be on. The report that the concrete tower of the Union Ferry Depot, a stone and reinforced concrete building, had been destroyed was probably due to the fact that the concrete fell off from a space about ten feet square on the west side of the tower near the bottom. Repairs are being made with dispatch. One of the gables of the nave of the building was also slightly damaged by the earthquake. In this connection it may be interesting to refer somewhat in detail to the pictures accompanying these remarks, as they strikingly indicate the appearance of some of the more notable buildings after the fire was under control.

The first illustration is a view of the ruins as seen from the corner of Post and Grant avenue looking southeast. At the extreme left of the picture is seen all that remains of what was once the famous Palace Hotel, constructed of brick and steel. This will be restored in due course. The tall structure immediately at the right is the new *Chronicle* Building, of the skeleton frame type with encasing masonry of brick. Just at the right of it and in the background is the remains of the old *Chronicle* Building, also of brick and steel, and which will be taken down and rebuilt. Near the center of the picture and surmounted by a flag staff is the Monadnock Building, which was in course of construction and which had been finished as far as the upper stories. This is of sand stone, brick and steel, and resisted the earthquake, the fire, as well as the dynamite explosions. It clearly demonstrated the superiority of steel skeleton construction, and will be restored in short order. The tall building at the right of it and in the background, also surmounted by a flag staff, is the Mutual Savings Bank Building, also of stone and skeleton frame. The tall structure at the extreme right of the picture is the Claus Spreckels or *Call* Building, of granite and steel, and which is rapidly being restored to a condition for occupancy.

The group of buildings presented in this picture shows that modern steel frame structures with good fireproofing will not only burn very slowly even when there is no water applied, but that the steel frames when covered with cement will go through earthquake and fire with comparatively little damage.

The second illustration is a view looking east on California street from Kearny, showing old and new types of buildings, every one of which was burned out. The structure immediately in the foreground and at the left is the California Savings Union Building, constructed of stone and brick about the year 1893. Next to it is the German Savings and Loan Society Building, with brick and stone facing. Further on, the ten-story structure from which the flag is flying, is the Kohl Building, erected of sand stone and steel three years ago. It was comparatively little damaged above the fourth floor. Some of the windows remained intact and some of the tenants have already reopened offices in the building. In the background, diagonally across the street and with the rounded front, is the New York Mutual Life Building, at the corner of Sansome street. The first two stories are of granite and the rest of buff brick, which burns slowly, so that the building is in condition to be restored. The tall structure at the right on California street is the Merchants' Exchange Building, constructed of steel skeleton frame and pressed brick. It was completed last year, and will be rapidly restored; in fact, some of the offices were ready for occupancy at the date of these advices, May 7. Practically the only damage to the skeleton frame was the buckling a little of the steel beams at the sixth floor. Just this side of the Merchants' Exchange Building is seen the remains of what was once the Safe Deposit Building, and immediately in the foreground at the right are the ruins of the California market, where a number of people were buried in the collapse.

Fig. 4.—Shell of the Donohoe Building, Corner of Market and Taylor Streets.

The San Francisco Disaster and the Present Building Situation.

The partial remains of Golden Gate Hall, at 667 Sutter street, is shown in the third illustration. This was a fine specimen of pressed brick and terra cotta construction, and most of the damage was caused by fire, the structure having withstood the earthquake shock comparatively well.

In the fourth picture is shown all that remains of the Donohoe Building, at the corner of Market and Taylor streets. It was constructed of brick about 1893, and the walls either fell down or were dynamited immediately after the fire.

The Building Situation.

Considerable delay has been caused by the uncertainty as to the provisions of the new building regulations, but the Board of Public Works will not revoke any of the permits for new buildings granted previous to the fire. It is held by the commissioners that the rules of the committee appointed to revise the municipal building laws cannot affect cases already decided.

Work on several buildings in process of construction will be continued immediately. In addition to these about 60 permits had been granted for buildings where actual work had not commenced. The plans call for structures of classes " B " and " C." They will be built of brick, with wooden interiors, in most instances. The board has been notified that construction will commence as soon as material is available.

A big seven-story hotel will be built by Charles Stewart on Geary street, opposite the St. Francis Hotel. The building will be a class " B " edifice. A six-story brick structure, originally intended as a storehouse, will be erected on the corner of Jackson and Drumm streets. A six-story building will also go up in East street, between Market and Mission.

No class " A " permits are out, except for buildings which were partially erected before the fire. No permits will be granted from now on until the new laws are formulated and passed. Applications for building permits of all kinds received daily by the Board of Public Works are being kept on file pending developments.

The commissioners have requested that City Architect Shea be allowed to confer with the Committee on Revision of the Building Laws. The architect does not favor the drastic regulations proposed by many. He believes that unless some latitude is allowed in the use of inflammable material the building indsutry will be paralyzed.

San Francisco Building Regulations.

Following are the building rules in San Francisco for the temporary period until new building laws are completed, as adopted by the Reconstruction of Buildings Committee and Board of Public Works:

Rule 1. Permits will not be required to erect temporary one-story structures of galvanized iron or wood, but they must be removed at 90 days' notice.

Rule 2. All permits for permanent structures must be obtained from the Board of Public Works.

Rule 3. Permits will not be required for repair of chimneys or roofs damaged by falling chimneys or other causes, but permit for use of said chimney must be obtained from the Building Committee before any chimney can be used or fire started.

Rule 4. All buildings outside burned district which were badly damaged by being thrown off their foundation or out of plumb must secure a permit for repair of said buildings from the Board of Public Works.

Rule 5. All matters pertaining to side sewers must be referred to the Board of Public Works.

Rule 6. Permits for operation of factories using steam or other power except electricity must be obtained from the Building Committee.

Rule 7. All factories operating by electrical current must obtain a permit from the Department of Electricity, and a further permit from the Building Committee before operating their plant.

Office of Building Committee, Gough and Golden Gate avenue.

Office of the Board of Public Works, 1762 Ellis street.

Office of Department of Electricity, 2034 Steiner street.

" Capital is also waiting for the new building ordinance. So far there is no inkling as to what the new permanent restrictions and limitations will be. But there is not the slightest doubt that new skyscrapers will be built.

" The State Board of Architects has the following suggestions to make in relation to the restrictions of the coming building ordinances. Thorough inspections and investigations have been made through the burnt district, and it has been found that safety is not a question of style of architecture, but quality of workmanship.

" Cornices and arches need not be excluded from the new city. Where they were properly anchored and built they withstood the shock and the fire both. It is the opinion of the board that the city beautiful need not be without its picturesque cornices and decorations.

Since the above was received the Council on Building Laws and the various subcommittees decided at a meeting held May 15 to recommend the following ordinance:

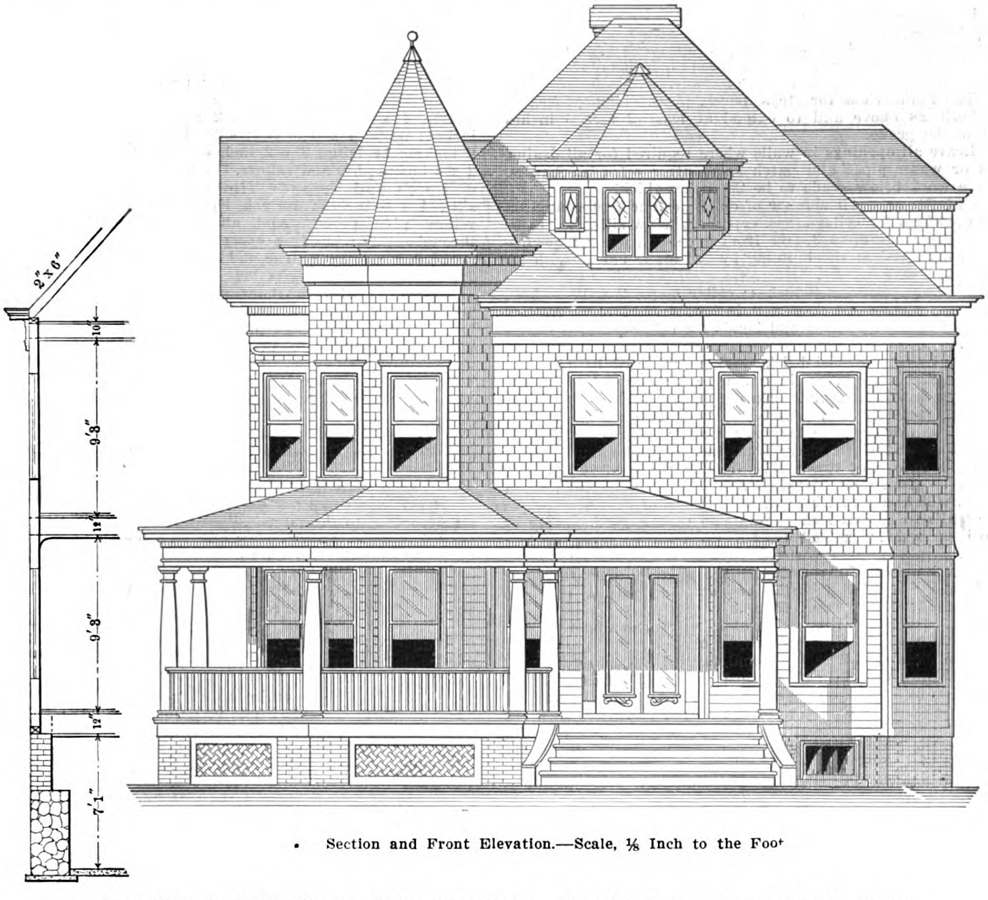
" On streets 100 feet wide or over the hight of buildings facing thereon shall be unlimited.

" On streets 80 feet wide or over the hight of buildings shall be limited to 200 feet.

COMPETITION IN $6500 HOUSES.

THIRD PRIZE DESIGN.

We take pleasure in presenting herewith the design awarded the third prize in the recent Competition in $6500 Houses and submitted by Alfred H. Lee, 2496 Eighth avenue, New York City. In connection with the plans, elevations and details, we publish an excellent likeness of the author reproduced from a photograph taken especially for our purpose. It will not be without interest to many readers of the paper to state that Mr. Lee was born in 1882 in New York City and was educated in its public schools. While having had no experience in an architect's office, he has studied architecture evenings under the instructions furnished by the International Correspondence Schools of Scranton, Pa., and also in the Mechanics' Institute, 16 to 24 West Forty-fourth street, New York City. For over five years Mr. Lee was in the drafting room of the J. B. & J. M. Cornell Co., and is at present employed in the ornamental department of the well-known firm of Post & McCord, 44 East Twenty-third street, New York City.



Section and Front Elevation.—Scale, ⅛ Inch to the Foot

Competition in $6500 Houses.—Third Prize Design.—Alfred H. Lee, Architect, New York City.

In its report the Committee of Award calls attention to the very complete specification furnished by the author; the excellent layout of the rooms; the planning of the stairs, especially the rear and attic stairs; good closet room, and to the feature of having the bathroom and toilet separate. In its suggestions regarding changes which, in the opinion of the members would improve the design, the statement is made that it would be better if the bathroom window were placed in the rear wall of the building instead of the side, as shown, and that the first story floor beams, from the girder to the outside wall under the kitchen and reception hall, should have a girder support, as the weight of the second story would tend to cause the first story floor to sag a certain amount. Attention is also called to the fact that the vestibule door would extend past the sliding door when open, which is an objection. Another point is that no electric wires are called for, which there should be in a house of this class.

Specifications.

The following are the specifications of labor and material as furnished by the author of the third prize design:

These specifications are intended to embrace all of the labor and materials required in the erection and completion of the building in all its parts, the whole to be comprised within any contract or contracts that may be made for the same. The entire work is to be constructed and finished in every part in a good substantial and workmanlike manner according to the building laws of Westchester County and to the accompanying drawings and these specifications, to the full intent and meaning of the same and to the entire approval and expectations of the owner and architect. Each contractor is to provide all materials and labor necessary for the complete and substantial execution of everything described, shown or reasonably implied, including all transportation, scaffolding, apparatus and all utensils requisite for same; all materials to be the best of their respective kinds and all workmanship to be of the best quality.

The following is a list of the drawings which accompany these specifications and which form part thereof: Front Elevation, Side Elevations, Cellar Plan, First-Floor Plan, Second-Floor Plan, Attic and Roof Plans, and Detail Sheets.

Care of Finished Work.

Particular care must be taken by the contractor of all the finished work as the building progresses, which work must be covered up and thoroughly protected from injury or defacement during the erection and completion of the building.

Where figures are not given all drawings must be accu-

rately followed and measured according to their scale. All writings and figures are to be considered a portion of these specifications and must be followed and considered.

The contractor shall not make any change in the plans; in case an error should appear the contractor must refer the same to the architect.

Masons' Specifications.

Excavations.—The cellar to be excavated to a clear depth of 7 feet 1 inch below the under side of first-floor joists. Trenches for all exterior and interior foundations to be dug 6 inches below the cellar bottom, and all other excavations that are necessary to carry out the plans, such as sewers, piers, step vaults, areas and all other foundations are to be well and faithfully done. The earth to be filled in and packed against cellar walls after mortar is dry and level with the bottom of underpinning.

Foundations and Stone Walls.—All footings, piers, foundations and stone walls to be built to correspond with the sizes marked or shown on the plans. The stone used in the foundation to be of approved field stone, the lower course to be laid with extra large flatstone; all to be carefully bedded on their broadest faces, all laid in cement mortar and each layer well filled and flushed up on both sides and firmly bound together. The stone foundations of outside walls to be built within 1 foot of grade.

The foundations for steps, porch, piers, chimney, &c., to be built as above and to extend at least 2 feet 6 inches below the grade.

Leave all openings in walls where required for all drains, gas or water pipes and patch same after other mechanics. Stone work below grade to be 20 inches thick.

Cut Stone.—All manner of cut bluestone represented on the drawings for cellar steps, coping, window sills, &c., to be of quarry stone dressed, free from flaws and other imperfections, delivered at the building by the stone cutter with all necessary drilling, &c.

Window sills, 4 x 8 inches; cellar steps, 2 x 10 inches; kitchen fireplace lintel, 4 x 8 inches, rubbed; hearths, 1½ inches thick slate; caps and bonds for cellar piers, 4 inches thick.

Brick Work.—All brick work represented by plans to be of well burned brick throughout, which must be laid wet in warm weather, or if laid in damp, freezing weather must be kept perfectly dry. All brick to be laid up in the best and most workmanlike manner; mortar to be composed of good lime and clean sharp sand in the proportions of two of sand to one of lime. The outside walls to be built of brick, as shown on plans. From top of stone foundation walls, which is 1 foot below grade, to top of first-floor beams the walls to be faced on the outside with a good quality of hard pressed brick and backed up with common upriver brick.

Level up carefully and bed the sills in cement mortar and point around them inside and out, and bed and point up around all cellar window frames.

All piers and walls to be built as represented by plans and of such dimensions as marked thereon.

The chimney to be built and carried up as represented by drawings, of good hard burned brick. The face of chimney above roof to be of good quality hard pressed brick.

All chimneys to be topped out as per elevation with red cement mortar, capped with blue stone cap. All chimney flues where possible to open into cellar, so that they may be cleaned out, and thimbles and stoppers put on. Build all skew back arches for hearths. The boiler chimney flue to be lined with tiled flue lining, 8 x 12 inches.

Fireplace.—Kitchen fireplace to be laid up with white enameled brick where exposed in white mortar with neat close joints in a satisfactory manner, to a hight of 5 feet 6 inches. Open fireplace to have a Jackson dome damper complete.

Lathing.—All walls, partitions, ceilings and all studded and furred places to be lathed with the best spruce lath full thickness and placed ¼ inch apart and nailed on every stud; all joints must be broken every 18 inches and all to be placed horizontally; long vertical joints will not be allowed, nor lath to be put on vertically to finish to angles or corners. All lath at corners or angles must be nailed to solid furring and lath will not be allowed to run from one room to another behind studding.

The lather must call upon the carpenter to furr and straighten all walls, ceilings, &c., and to block and spike all studs together solidly at angles; in all cases lath below grounds to floor and behind all wainscoting.

Plastering.—The walls and ceilings of all rooms and apartments throughout to be plastered with two good coats of sand, lime and hair mortar. Scratch coat, brown finish and hard finish. Use good unslacked lime of the best brand for that purpose and goat and cattle hair, and clean sharp sand, free from loam, all to be well mixed and manipulated and in proportion as required and stacked in the rough at least four days before applying to the wall. The first coat to be applied with sufficient force to secure good clinches. All lime to be worked through a fine wire mesh sieve before being mixed.

All sand must be screened through a proper size wire mesh sieve before using same. The brown finish rodded, floated and made straight, and the hard finish must be left perfectly smooth and white; no spots must appear. Mason to do necessary pointing when other craftsmen have finished their work. The walls to be thoroughly protected from frost by keeping fires in freezing weather. Cellar ceiling to be plastered one coat.

Cellar.—The cellar bottom must be leveled off. Pack and settle it thoroughly and cover it flush and smooth with cement concrete 3 inches deep in three parts of coarse gravel or small stone and one part of Rosedale cement, and the entire surface to be flushed up even and smooth. The last coat to be ½ inch thick, of Portland cement. All exterior studding to be beam filled with broken brick from top of sill of first floor beams.

The mason to furnish and stick a good centrepiece of approved design in parlor, hall, library, dining room and front chamber, to cost $2.50 each.

Carpenters' Specifications.

Scantlings, 2 x 4 inches; first floor beams, 2 x 12 inches, 16 inches from centers; second floor beams, 2 x 12 inches, 16 inches from centers; attic floor beams, 2 x 10 inches, 16 inches from centers. All floor beams spruce. Rafters, 2 x 6 inches, 24 inches from centers; partitions, 2 x 4 inches, 16 inches from centers; bearing partitions, 2 x 4 inches; sliding door partitions, window and door studs, 3 x 4 inches. Plates, 4 x 4 inches, or two 2 x 4 inches. Girths, 4 x 6 inches; posts, 4 x 6 inches; sills, 4 x 6 inches; girders, 6 x 8 inches; bridging, 2 x 2 inches or 1¼ x 3 inches; braces, 2 x 4 inches; hip and valleys, 3 x 8 inches.

Porch and Veranda Timber.—Rafters, 2 x 6 inches; sills, 4 x 6 inches; 10-inch Koll's patent, as shown, clear yellow pine posts. And all necessary timber required throughout the building except floor beams to be of good sound hemlock, sawn true and square, free from sap, shakes, dry rot or other imperfections impairing its durability; and all timbers used throughout must be prepared and framed according to the plans, sections and details. All beams to have the crowning edge placed upward and properly sized where required. Also prepare and size all studding, &c. Cross bridge all beams at distance not exceeding 8 feet apart. All trimmers and headers must be framed double and in no case allow less than 4 inches between chimney breast and trimmers.

Frame.—The house to be full frame and all frames stayed and braced in the strongest manner perfectly true and plumb.

To be a mortise and tenon frame.

Partitions.—All partitions throughout the building to be set according to the plans. Bearing partitions on first floor must foot upon girders below and be capped on second story with plate for the reception of beams. Bearing partitions on second floor to foot upon the plate. The studs at angles to be thoroughly spiked together before being placed in position. All doors over 3 feet 6 inches wide to be trussed over the top thoroughly and substantially. All partitions to be sized to a straight edge. Beams in all cases to be doubled under all stud partitions. Grounds put on to plaster throughout the building.

Sheathing.—The entire building to be sheathed on the outside with good sound hemlock, ⅞ inch, tongue and grooved, or ship lapped boards, face not to exceed 10 inches in width, nailed with two 8d. nails to each bearing, placed on frame diagonally; 1 x 2 inch strip to be nailed first on sill, then sheathing to start from that.

Exterior Lumber.—All the exterior finishing lumber to be compassed of white pine lumber, free from sap, shakes, black knots or hard knots over 1 inch in diameter. Corner boards, windows and door casings, cornices, water table, verandas, bands, sidings and all manner of finish shown on plans and details to be composed of lumber as above specified and primed as soon as put up. The exterior finish of the building, where required by the plans, to be covered with ½ x 6 inch bevel siding.

All joints neatly cut and heading joints smoothed off, and all to be primed as soon as possible after put on.

Verandas.—Construct all porches or verandas in strict accordance with the working drawings prepared for the same.

Form all moldings required for all cornices, railings, columns, capitals, &c., with exactness, in conformity with the full size sections for same.

Cornices.—All cornices to be constructed in accordance with the working drawings for same. All moldings must be worked with exactness and no stock moldings will be allowed unless sanctioned by the architect or owner. All gutters must be carefully graded to run all the water to the required outlets, all to be put up in a substantial manner.

Building Paper.—The entire exterior surface of the building to be covered with Empire No. 70 or twoply rosin sized building paper, well put on; the studding joints well lapped.

Roofs.—Cover all roofs, including those of porch, piazza, &c., with good spruce furring lath 1 x 2 inches, well nailed on every rafter. All of the rough carpentry necessary to form the projections of eaves as required for all cornices, gutters, &c., to be done in accordance with the plans and

details. All to be composed of good, sound lumber and put on in a good, substantial manner.

Shingles.—All roofs to be covered with 18-inch cypress shingles, laid 5½ inches or less to the weather. The shingles used on dormers and gables and second story, &c., to be 6 x 18 inch clear butt white pine, laid not over 5½ inches to the weather.

Leader holes placed where directed. Provide rough spruce brackets for plastered coved ceiling in hall, parlor, dining room and library.

Floors.—First floor to be covered and notched around studding with rough tongue and grooved or ship lapped hemlock, laid diagonally, and finish over this with No. 1 comb grain yellow pine ⅞ x 2½ inches, planed smooth for painter.

Attic and second floor to be floored with ⅞ x 3½ North Carolina pine, free from loose or black knots, all securely nailed to each bearing.

Window Frames.—Window frames to be white pine. Main sill 2 inches; subsill, ⅞ inch; jambs, 1¼ inches; outside casing, 1¼ x 4¾; parting strips, ½ x ⅞ inch; lined stop, ⅞ x 2 inches; frames made with pockets and to have 2-inch axle pulleys with polished wheel. All frames to have caps of tin furnished by plumber.

Window Sash.—To be double hung sash, 1½-inch white pine; to be evenly balanced with weights on Silver Lake sash cord. All windows to have approved antique copper sash locks and flush lifts. All to be glazed with double thick glass, free of waves. Cellar sash as shown, with hardware appliances to secure them open and shut.

The porch floors to be of white pine, 1¼ inches thick and 4-inch face, the joints to be well laid in white lead.

Interior Finish.—All to be constructed as required by the plans and details, with sound, clear, kiln dried cypress, unless otherwise specified. All put up with neat close joints, smoothed up and sandpapered. Base put down in all apartments not wainscoted. All trim to be back molded. Beads to be put on all corners. Variety of finish to be used in the various rooms, as follows:

Trim for reception hall, parlor, library and dining room to be of quartered oak. Panel backs at all windows on first floor.

ALFRED H. LEE,
Winner of Third Prize in $6500 House Competition.

Side (Left) Elevation.—Scale, ⅛ Inch to the Foot.

Competition in $6500 Houses.—Third Prize Design.—Elevation and Portrait.

All rooms, except parlor, reception hall, library, vestibule, dining room, to be finished in cypress, 5-inch D. G.; 4½-inch W. C. nosing apron and steps as required; 8-inch base; 1¼-inch base molding.

Place picture moldings in all rooms to match same, as per detail. All trim in vestibule to be birch, stained mahogany.

Stairs.—All stairways to be built where located on plans. The main staircase to be built and supported on 1¼-inch strings. The risers to be ⅞ inch and the treads 1¼ inches thick. Dimensions in all cases for hight of risers and width of treads to be measured from the building; front stairs, quartered oak. The triangular spaces under stairs to be paneled as per detail. All stairs must be put up after plaster is dry, as required by plans. Rear stairs to be cypress.

Doors.—The front and vestibule doors to be 7 feet 4 inches high, 1¾ inches thick, raised molding, veneered birch on both sides, with pine core and mahogany panels. The door between dining room and butler's pantry, reception hall and rear stair entrance to be 1½ inches thick, 6 feet 10 inches high, veneered quartered oak one side and cypress on other on pine core. The door under stair to be 6 feet 10 inches high, 1½ inches thick, veneered quartered oak. The bath-

room door to be 1½ inches thick, 6 feet 8 inches high, veneered quartered oak, one side cypress, the other on pine core. The sliding doors to be 1¾ inches thick, 7 feet 6 inches high, veneered quartered oak on pine core. All other doors on first floor to be 1½ inches thick, 6 feet 10 inches high, cypress mold both sides; rear door to be glazed. All other doors on second floor to be 1½ inches thick, 6 feet 8 inches high, cypress, molded both sides. All doors in house to be made clear free from sap. Width of doors are marked on floor plans.

Cellar Doors.—All outside and inside cellar doors required by the plans to be made of one thickness ⅞-inch ceiling boards, hung to strong plank cased frames.

Butts.—Hang all doors throughout with loose joint butts of sufficient size to throw them clear of architraves.

All doors over 7 feet high to have three butts each. Butts on front doors to be 4 x 4 antique copper acorn tipped. Butts on inside doors to be 3½ x 3½ antique copper. All dwarf doors throughout to have suitable butts to match other furniture and all door butts to be loose joints. The cellar doors to have strong wrought iron hinges, with hooks and staples.

Knobs, Roses and Escutcheons.—The front vestibule doors to have antique copper knobs, roses and escutcheons. All inside doors to have oak knobs and antique copper escutcheons, bevel edged. Front door plates to be 2½ x 8 x 9. Inside doors to be 1½ x 6, all antique copper bevel edged. Sliding doors to have flush antique copper hardware and locks. Furnish push button and plate to match front door escutcheons.

Locks.—Front and vestibule doors to have a 5-inch front door lock, with two keys, and have antique copper front and striking plate. Front doors to have flush bolts. All doors inside to have a good 3½-inch mortise lock and antique copper front and striking plates. All small closets, presses, drawers, &c., to have suitable locks, approved by owner or architect, of antique copper. All door locks throughout to be mortise locks of a good manufacture. No outside blinds required.

Newels, Rails and Balusters.—The newels, rails and balusters for main staircase to be of select dry oak, worked in accordance with the detail drawings. All outside stairs to be built on strong plank strings, provided with 1¼-inch plank steps and ⅞-inch risers of pine, well put up and thoroughly secured. Rail, 2½ x 3½ inches; balusters, 1½ x 1½, placed 1 inch apart, strings paneled; newels, 5 x 5; starting newel, 6 x 6, bored for gas pipe.

Closets.—The closets to be fitted up with beaded cleats for the reception of wardrobe hooks. Also put up one row of shelves on each side, placed on beaded cleats.

Wardrobe Hooks.—Put one row of wardrobe hooks in all clothes closets, on all available sides, 8 inches apart, and all other hardware and trimmings to make the whole job complete, to be furnished of the best kind specified.

The hardware and trimming of all kinds throughout the building required and not specially cited to be furnished in conformity with other work where used.

Butler's Pantry and Kitchen.—The sinks to be open, with oak drip boards set on brackets.

Mantels.—Neat mantels in parlor and hall, to be selected by owner, to cost $55.

Coal Bins.—As marked on plans, of 1 x 10 hemlock.

Miscellaneous.—Place door stops with rubber tips to prevent knobs from striking walls; build lattice as per elevation. Carpenter to do all cutting for plumber. Leaded glass, where indicated by plans by L. G., to cost 75 cents per foot, selected by owner. Place ½-inch quarter round at all base. Veranda ceiling to be beaded, ½ x 3 inch yellow pine, clear. Ground glass represented by G. G.

All dresser hardware to be of antique copper, drawer pulls included. Place five rows of shelves in pantry and linen closet where required. Glass doors and dresser made of cypress. Carpenter to place rough cove brackets in ceiling of reception hall, parlor, dining room and library, 10 inches deep. Sliding doors hung on McCabe patent parlor door hangers. Veranda balusters to be 1½ x 1½, placed 1½ inch apart.

Furnish and set in rear yard four turned clothes posts.

Laundry to be built of ⅞-inch white pine ceiling boards. Build platform for tubs. Cellar stairs to be built on rough 1¼-inch strings; treads, 1¼ inch.

Carpenter to allow $100 for tiling bathroom floor and side walls. The carpenter to cut and board the beams to receive grouting.

The door between dining room and butler's pantry to be hung on approved double acting spring butts.

Painters' Specification.

All exterior wood and iron work to receive three good coats English B B lead and linseed oil in colors as specified. All shingles to be dipped in H. W. Johns or equally as good shingle stain in colors as directed, then to receive two brush coats.

Shellac all knots with best shellac previous to priming and paint all tin flashing valleys and gutters with two good coats of best metallic roof paint. All wood work to be primed as soon as put up.

Exterior Color Scheme.—The roof shingles to be stained a dark gray. The second-story shingles and front of dormers to be stained light green. The siding and first story to be painted buff color. All cornices, window frames, door frames, porch columns and balusters, water tables, &c., to be white. Floor of porch and treads of stoop to be slate color. Risers to be same color as siding. Grills under porch to be light green. The hand rail on balcony to be stained imitation mahogany. The vestibule and frame of front doors and frame on outside and veranda ceiling to have three good coats of spar varnish.

Interior.—All interior wood work, except oak, to be filled with one coat of the best Armitage wood filler, after which same to receive two coats Armitage's No. 2 inside varnish, well sandpapered between coats, left gloss finish. All oak to be filled with Wheeler's paste filler, after which same to receive two coats Armitage's No. 2 inside varnish, well rubbed down between coats.

The bathroom to receive three coats of the best white lead, sandpapering between each coat, and one coat of enamel, rubbed to a dull finish.

Plumbing and Tinning Specifications.

These specifications are intended to embrace all of the labor and materials necessary for the plumbing of the entire building, the whole to be comprised within any contract that may be made for the same. The entire work to be done and finished in every part in a good, substantial and workmanlike manner, according to the accompanying drawings and these specifications, to the full intent and meaning of the same, and to the entire approval and acceptance of the building laws, the owner and architect.

The plumber will give his personal superintendence to the work and the architect is to have access to the work at all times, and upon demand by the architect the plumber will remove any incompetent person or workman and materials not in accordance with these specifications, at the expense of the plumber.

The plumber will furnish all implements, cartage and transportation, including any materials or labor not specially mentioned, but which is necessary for the proper carrying out of these specifications.

The plumber to comply with all rules and regulations of city authorities that may be required and pay all fees necessary to render the work complete and ready for use.

Notices.—The plumber is to give to the proper authorities the requisite notices relating to his charge, obtain official permits and license for temporary obstruction and pay all proper fees to complete his work ready for use. He is also to carry forward his work with the greatest reasonable rapidity. The owner shall not bear any expense of the above nature.

Digging.—The plumber to do all the digging necessary for the finishing of his work and fill in with the work well rammed. Care must be taken not to undermine walls, piers or supports of any kind.

Pipes.—The carpenter to put up beaded strips upon which to run all water and service pipes, so that they may be gotten at for examination at any time. No pipes will be allowed to run on the outside walls of building unless it should be absolutely necessary. All pipes in the building in exposed places or pipes filled with water liable to freeze must be packed with nonconductive material, properly cased and boxed, to the satisfaction of the owner and as may be required.

Grade of Pipes.—Water pipes must in every case have a gradual fall from the fixtures which they supply. The soil pipes must have a fall of at least ¼ inch per foot.

Tinning.—All angles, valleys, gutters, &c., of all roofs to be covered with the best M. F. roofing tin (charcoal), painted on both sides.

The gutters to be properly lined and run the tin up under the shingles at least 6 inches. Bring the tin over the face of the cornice and tack it down smoothly. All tinning throughout to be well soldered with rosin and made perfectly water tight. Corrugated leaders of galvanized iron put up where required, with all necessary curves, brakes, bends, &c., to carry the water from the several roofs to grade. The leaders to be of 3-inch caliber and to be given proper fall and hooked to building with iron hooks. All proper and necessary places to be flashed, whether specified or not, and everything requisite to make all places water tight must be done. All leaks to be stopped after other craftsmen and everything left perfectly water tight on the completion of the building.

All valleys to be not less than 20 inches wide. All tin roofs painted on under side in a satisfactory manner. All piazzas to have 2½-inch leaders in the least exposed places. All tinning for gutters, valleys, and all flashing to be painted on both sides by tinner. All flashing to be furnished by tinner; caps for all windows.

Cast Iron Pipes.—All cast iron pipes, including both waste and air pipes, to be sound and free from flaws; all to be put up in the strongest manner with iron hooks and staves, with all proper and necessary fittings.

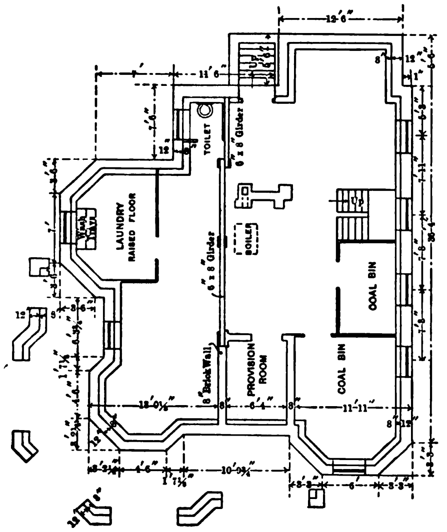
Lead Pipes.—All vertical lead pipes to be supported by hard metal tacks soldered to the pipe and fastened with

brass screws to strips furnished by carpenter. Tacks to be not more than 2 feet apart. All horizontal lead pipes must be supported through their lengths on boards or shelves to prevent their sagging.

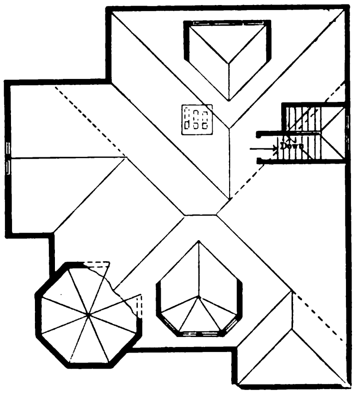
Joints.—All joints between cast iron and lead pipes must be made by heavy brass ferrules of the same size as lead pipe, soldered onto the lead pipe and calked into the iron pipe. All joints between brass and galvanized iron and lead pipes to be made by means of proper brass soldering nipples.

City Water Supply.—City water brought from main through ¾-inch A. A. lead pipe, with ⅝-inch A. A. lead branches to fixtures, as specified, with stop and waste cock on inside of front cellar wall.

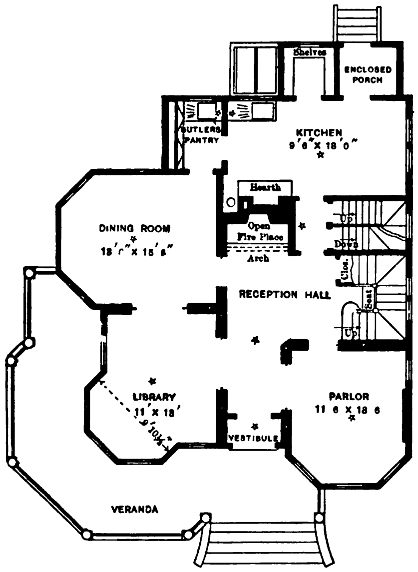
Iron Soil and Waste Pipe.—Extend a 4-inch extra heavy cast iron pipe from cellar up through building and 2 feet above building. Gap same with wire basket and connect same with tile sewer pipe outside of wall and connect same complete with sewer through 5-inch glazed tile sewer pipe, and place a 4-inch trap in cellar on said pipe, with 4-inch iron vent pipe extending through cellar wall and to be carried not less than 15 feet from building and to be topped out with 4½-inch round bend, and put 4-inch cleaning screws on said trap in cellar. The soil pipe to receive all soil and waste pipes from all fixtures.



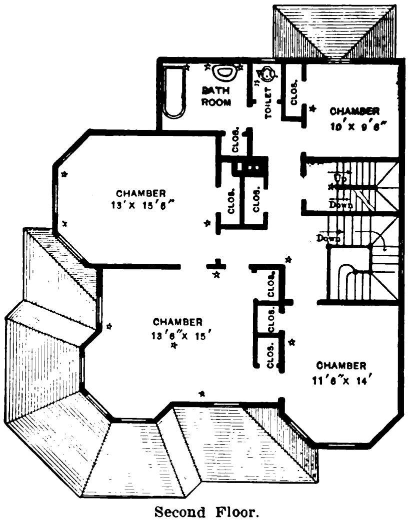
Foundation.



Attic and Roof.



First Floor.



Second Floor.

Competition in $6500 Houses.—Third Prize Design.—Floor Plans.—Scale, 1-16 *Inch to the Foot.*

Extend a line of 2-inch cast iron pipe up alongside of main soil pipe, with all necessary branches for back airing all traps, the said pipe to extend up and above the highest fixture in the house; then turn the line into the main soil pipe at top and all to the left complete where the soil pipe extends through roof. Water tight joints must be made by providing a flashing of 6-pound sheet lead 18 inches square, with a funnel around the pipe.

The flashing to be securely put under the roof, turned over and caulked into the hub of the pipe with brass ferrules.

Range.—The range will be furnished by the plumber, with water back and all lead pipes and brass couplings necessary to connected the range with boiler ready for use.

The range to be what is known as No. 68 Perfect, Richardson & Boynton make.

Boiler.—Furnish and set a 40-gallon galvanized iron boiler of 150 pounds pressure, set on cast iron stand, supplied with hot and cold water through ¾-inch A. A. lead pipe and connected with water back of range through ¾-inch A. A. lead pipe and brass couplings.

Place a shut off cock on supply pipe and sediment cock below. Take hot water from boiler to and over sink in kitchen and butler's pantry with a ⅝-inch A. A. lead pipe. Connect with hot water pipe at its highest point and bottom of boiler, a ⅝-inch A. A. lead circulating pipe. Run separate lines of ⅝-inch A. A. lead supply for both hot and cold water to bathroom.

Kitchen Sink.—Furnish and fit up where indicated on plans galvanized iron sinks with galvanized iron back. Size of sink to be 20 x 30 inches set on nickel brackets. Supply with hot and cold water through ⅝-inch A. A. lead pipe and to have ½-inch brass draw-off cocks. To have 1½-inch D. lead waste pipe and trapped with Deboise trap.

Wash Trays.—Wash tubs to be Albertine stone and to be two-compartment tub with cover and leg complete, as shown with overflow connections, supplied with hot and cold water and to have ⅝-inch finished wash tray cocks and stoppers, &c., as required, all left complete, ready for use.

Water Closets.—Furnish and set in bathroom on white marble slab, a plain F. N. DuBois syphon, plate B 159 water closet, with seat and cover and tank quarter oak polished, closet to be supplied with water through ⅝-inch A. A. lead pipes. Also furnish and set in laundry an all-porcelain wash out water closet with hard wood seat and cover, all properly back aired.

All exposed plumbing in bathroom and second floor toilet to be of the best quality nickel plated.

Lavatory.—Furnish and set in bathroom complete as shown on plate B. 248, a F. N. DuBois & Co. 33 x 22 inch oval enameled lavatory on enameled pedestal connected with hot and cold water, properly trapped and back aired.

Bathtub.—Furnish and fit up in bathroom a 5-foot perfect enameled nickel plated top nozzle supply and waste, as shown on F. N. DuBois & Co. plate B. 29, properly trapped and back aired.

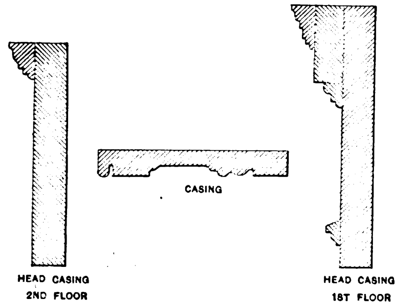
Traps.—Bathtub, wash basin, wash trays and all other fixtures each to have separate traps, and all traps to be put in so that they can easily be gotten at to clean out at any time. All traps to be furnished of the DuBois make where not otherwise specified, and all traps to be ventilated and have brass couplings on each ventilating pipe. All traps, &c., to be furnished and completed to the satisfaction of the inspector.

Stop Cocks.—Place two ¾-inch stop cocks over the boiler, or where directed, to shut off water from bathroom, and on all riser pipes where required.

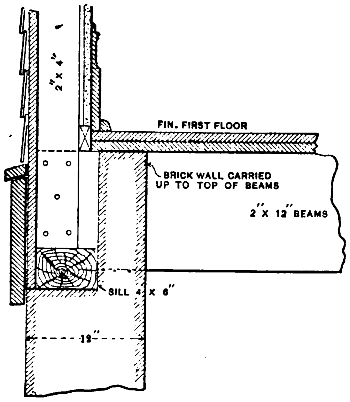
Water Test.—All soil or supply pipes laid in the building to be tested as required before the fixtures are attached.

Gas Piping.—Use good wrought iron gas piping of the sizes required. No pipe less than ⅜ inch for fixture connections. The mains to be run as direct as possible and so graded that any water gathering in pipe can be run out at a convenient point near the water. Secure all pipes in place with iron holdfasts.

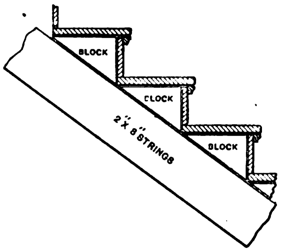
The pipes run to supply burners where directed on plans by check. Nipples for fixtures stand at right angles to wall surface and must project 1¼ inch from same. The gas pipes



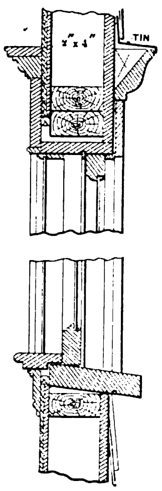
Details of Casings.—Scale, 3 Inches to the Foot.



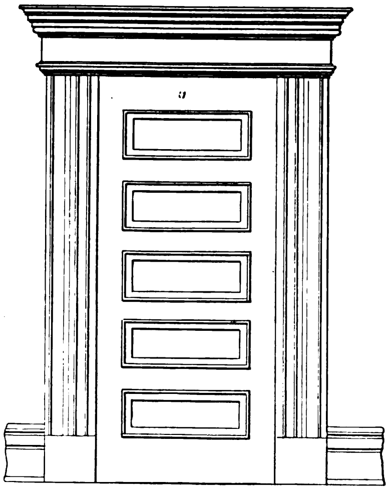
Detail of Main Sill and Water Table.—Scale, ¾ Inch to the Foot.



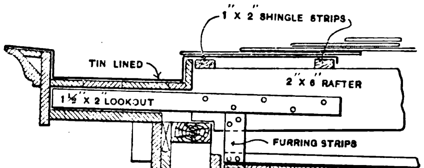
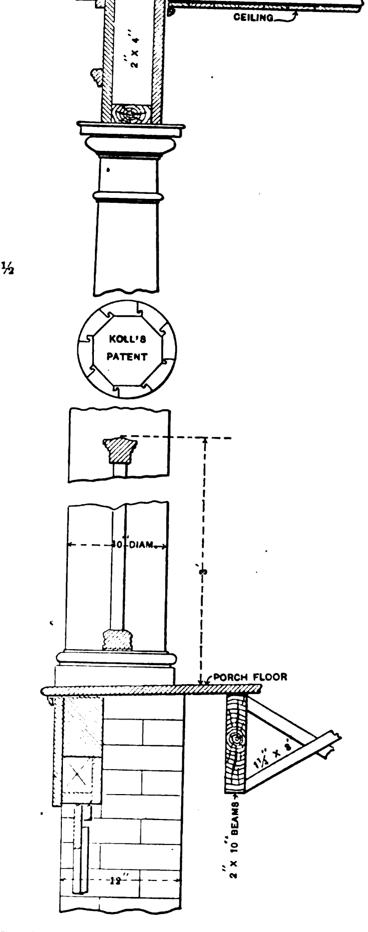
Detail of Porch Steps.—Scale, ½ Inch to the Foot.



Section through Second Story Window Frame.—Scale, 1 Inch to the Foot.



Elevation of First-Story Doors.—Scale, ⅜ Inch to the Foot.

Section of Porch.—Scale, ¾ Inch to the Foot.

Competition in $6500 Houses.—Third Prize Design.—Miscellaneous Constructive Details.

to be put up as required by the rules and regulations of the gas companies. Put the joints together with red lead.

All pipes to be capped, proved tight and caps left on. Plumber to lay 4-inch glazed tile drain pipe from leaders at building 15 feet away to barrel or stone dry wells.

Hot Water Heating Specification.

Heater.—Furnish and set where shown on plans one No. 718 Capitol hot water heater, manufactured by U. S. Heater Company, 129 Worth street, New York City, the entire heater, except the front, to be covered with asbestos sponge cement.

Fire Tools.—Furnish with the heater a complete set of fire tools, consisting of poker, hoe and two cleaning brushes.

Smoke Pipe.—A chimney of ample dimensions and of sufficient draft will be provided by the owner of the building. The heating contractor is to connect the heater to the chimney by a galvanized iron smoke pipe, 10 inches in diameter and of No. 24 gauge iron.

Trimmings.—The apparatus is to be provided with all trimmings and appliances necessary for its proper operation. One brass cased thermometer placed so as to indicate the temperature of the water as it leaves the boiler; one altitude gauge properly connected to indicate in the boiler room the level of the water in the expansion tank. The boiler to be provided with ¾-inch feed water pipe having a straightway valve and connected with water supply in the boiler room. Also make drain connection from boiler to soil pipe, properly trapped.

Expansion Tank.—Where shown on plan place a galvanized wrought iron expansion tank having a capacity of 15 gallons. This tank to be riveted perfectly water tight and provided with all connections necessary for the attachment of pipes.

Overflow Pipe.—From the upper portion of the expansion tank and above the water line run an overflow pipe of not less than 1-inch internal diameter to cellar drain or some connecting waster.

Vapor Pipe.—Furnish and connect in place, running from the top of the expansion tank to the external atmosphere, a vapor pipe 1 inch in diameter, by which any steam that may be generated by the heavy firing will be discharged directly into the atmosphere.

System of Warming.—The building to be warmed by direct radiation and by the system as shown on plans.

Radiating Surface.—The amount of radiating surface is given on plan for each radiator.

Radiators.—All radiators to be the Solus pattern, of such hight as shown in schedule.

Radiator Valves.—The direct radiators are to be provided with quick opening wood wheel, finished nickel plated all over radiator valves and nickel plated Union elbows.

Piping.—The system shall be a low pressure hot water system. All mains, risers and connections properly run and of sufficient size to insure perfect circulation.

Pipe.—All pipes used throughout the construction of this apparatus to be of the best quality wrought iron pipe of standard weight and dimensions, with full cut taper threads and ends smoothly reamed after cutting. All pipes 1¼ inches and under to be butt welded and all pipes 1½ inches and over to be lap welded.

Fittings.—All fittings to be made of the best gray cast iron, heavily beaded, and have clean cut taper threads.

Expansion and Contraction.—Throughout the system of piping all expansion and contraction is to be provided for by right angle turns and through the use of sliding expansion joints or other devices requiring packing.

Joints.—The entire system of piping is to be put together with screwed joints having a clean cut taper thread and without the use of cement of any kind.

Hangers.—All horizontal overhead pipes will be suspended by perfection wrought steel adjustable expansion hangers.

Covering.—All mains and branches in cellar to be covered by low pressure sectional covering.

Cutting.—All cutting of holes through the floors, ceilings or partitions necessary for the proper erection of the apparatus herein specified is to be done by the heating contractor.

Protection of Wood Work.—All wood work coming in contact with pipes to be properly protected with lining IX tin. Where pipes pass through floors or ceilings they are to be fitted with nickel plated floor or ceiling plates.

Painting and Bronzing.—All exposed piping or other iron work in the boiler room to be neatly painted with black graphite paint. All pipes and radiators above the basement will be painted with one coat of yellow ochre mixed in boiled linseed oil and bronzed to correspond with the decorations of the room in which they go.

All material used in the construction of this apparatus shall be new and of the best quality, put up by skilled workmen, under the supervision of a competent foreman. When the apparatus is complete it shall be filled with water, fired up and tested and left ready for use. The contractors of other parts of the work shall co-operate with the heating contractor, so that the job as a whole shall be a finished and complete one of its kind.

Guarantee.—The contractor guarantees that the apparatus when completed shall be entirely free from all mechanical defects, noiseless in operation and of sufficient capacity to warm each of the rooms in which radiation is placed to a temperature of 70 degrees in zero weather. If, after this apparatus shall have been accepted by the owner, any part thereof shall fail to accomplish the guarantee herein contained, by reason of any defect in the same, the contractor shall remedy such defects at his own cost within a reasonable time after receiving written notice of such defects. The term "defect," as above used, shall not be construed as embracing such imperfections as would naturally follow improper treatment or the wear and tear of use.

Schedule of Radiation.

	Sq. ft.	No. Sec.		
FIRST FLOOR.				
Parlor	74¾	1-23	8 col.	Solus 23 inches.
Library	75	1-15	5 col.	Solus 22 inches.
Dining room	71½	1-22	8 col.	Solus 23 inches.
Hall	99	1-11	4 col.	B. & S. 44 inches.
Conservatory	18	1-2		Wall rad. F. W.
SECOND FLOOR.				
Parlor chamber	71½	1-22	8 col.	Solus 23 inches.
Library chamber	100	1-20	5 col.	Solus 22 inches.
Dining room chamber	61¾	1-19	3 col.	Solus 23 inches.
Kitchen chamber	45½	1-14	3 col.	Solus 23 inches.
Bathroom	20	1-4	3 col.	Solus 38 inches.

Detailed Estimate of Cost.

The estimate of cost of the suburban dwelling shown herewith and as furnished by the author, is as follows:

EXCAVATION.	
Cellar excavations	$90.00
Grading	16.00
Total	$106.00
MASON WORK.	
Stone foundation walls	$90.00
Brick foundation walls	180.00
Brick foundation for porch	40.00
Outside cellar stairs	20.00
Chimney and fireplaces	112.00
Brick piers and cement floor in cellar	110.00
Bluestone sills and coping	15.00
Pointing	10.00
Total	$577.00
CARPENTER WORK.	
Hemlock framing timber	$400.00
⅞-inch hemlock sheathing	90.00
Sheathing paper	20.00
Siding	75.00
Second story and gable shingles	115.00
Roof shingles	90.00
Corner boards, water table, bands, cornices	28.00
Window frames and casings	175.00
Window sash and glass	140.00
Window weights and cord	20.00
Veranda	180.00
Bulkhead and cellar doors	12.00
Cellar partitions	28.00
Grounds	10.00
McCabe hangers for sliding doors	20.00
Sliding doors	150.00
Dresser, butler's pantry	17.00
Paneling and trim for vestibule	28.00
Vestibule doors	85.00
Doors and trim throughout	886.00
Window trim throughout	275.00
Baseboards throughout	100.00
Service stairs	60.00
Main stair	60.00
Rough and finished flooring throughout	233.00
Mantels	55.00
Hardware throughout	102.55
Carpenter labor	1,170.00
Cutting for mechanics	25.00
Total	$4,099.55
MISCELANEOUS.	
Electric bell	$8.00
Tiling for bathroom	100.00
Mosaic floor and marble sills in vestibule	18.00
Total	$126.00
PLASTERING.	
Lathing and plastering	$210.00
Total	$210.00
PAINTING.	
Cellar whitewashing	$10.00
Exterior	230.00
Interior	130.00
Total	$370.00
PLUMBING.	
Plumbing and tinsmithing	$490.00
Heating	520.00
Total	$1,010.00
RECAPITULATION.	
Excavation	$106.00
Mason work	577.00
Carpenter work	4,099.55
Plastering	210.00
Painting	370.00
Plumbing and tinsmithing	1,010.00
Miscellaneous	126.00
Total	$6,498.55

The builders' certificate accompanying the drawings of the suburban dwelling shown herewith, which is intended to be built at Kingsbridge, N. Y., was signed by Charles James & Co., carpenters, builders and general contractors, 2440 Broadway, New York City.

MAKING CONCRETE WALKS AND POSTS.

THE use of concrete in connection with building construction and for other purposes is growing so rapidly in favor throughout the country that builders everywhere are interested in the proper methods of mixing, the correct proportions of ingredients to give the best results in practice, the manner of constructing the wooden "forms," &c. Inquiries are constantly being received as to methods employed in doing certain kinds of work in which concrete is the basis, and with a view to meeting some of these requirements we present herewith copious extracts from a Bulletin issued by the United States Department of Agriculture, from the Office of Public Roads. It is in effect a paper by Philip Wormley, Jr., giving elementary directions for the preparation and use of cement mortar and concrete, and while the matter bears especially on the use of cement and the adaptability of concrete for various farm purposes, it is of a nature to prove instructive and valuable to those not altogether familiar with the subject.

The extracts which we have made relate more especially to the method of making concrete sidewalks and the construction of reinforced concrete fence posts. In regard to the former the Bulletin states that the "ground is excavated to subgrade and well consolidated by ramming to prepare it for the subfoundation of stone, gravel or cinders. The depth of excavation will depend upon the climate and nature of the ground, being deeper in localities where heavy frosts occur or where the ground is soft than in climates where there are no frosts. In the former case the excavation should be carried to a depth of 12 inches, whereas in the latter from 4 to 6 inches will be sufficient. No roots of trees should be left above subgrade.

"The subfoundation consists of a layer of loose material, such as broken stone, gravel or cinders, spread over the subgrade and well tamped to secure a firm base for the main foundation of concrete, which is placed on top. It is most important that the subfoundation be well drained to prevent the accumulation of water, which, upon freezing, would lift and crack the walk. For this purpose it is well to provide drain tile at suitable points to carry off any water which may collect under the concrete. An average thickness for subfoundation is 4 to 6 inches, although in warm climates, if the ground is firm and well drained, the subfoundation may be only 2 to 3 inches thick or omitted altogether.

"The foundation consists of a layer of concrete deposited on the subfoundation and carrying a surface layer or wearing coat of cement mortar. If the ground is firm and the subfoundation well rammed in place and properly drained great strength will not be required of the concrete, which may in such cases be mixed in about the proportions 1-3-6, and a depth of only 3 to 4 inches will be required. Portland cement should be used and stone or gravel under 1 inch in size, the concrete being mixed of medium consistency, so that moisture will show on the surface without excessive tamping."

To give a neat appearance to the finished walk, a top dressing of cement mortar is spread over the concrete, well worked in and brought to a perfectly smooth surface with straightedge and float. This mortar should be mixed in the proportion 1 part cement to 2 parts sand, sharp, coarse sand or screenings below ¼ inch of some hard, tough rock being used. The practice of making the concrete of natural cement and the wearing surface of Portland is not to be commended, owing to a tendency for the two to separate.

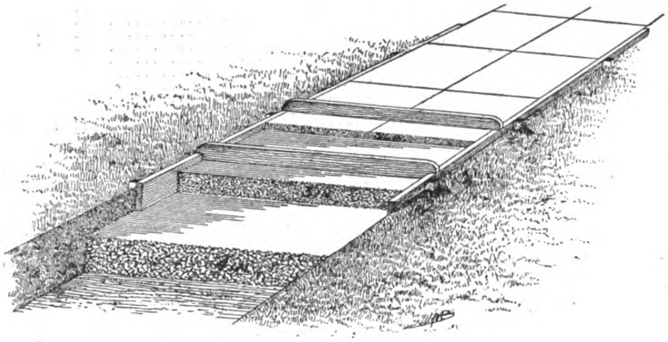


Fig. 1.—Details of Concrete Walk Construction.

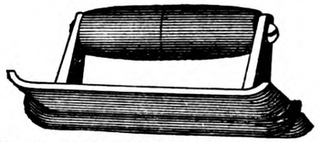


Fig. 2.—Jointer Used in Dividing Walk Into Sections.

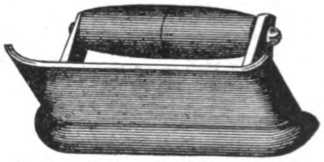


Fig. 3.—Tool Used in Rounding Edges.

Making Concrete Walks and Posts.

A cord stretched between stakes will serve as a guide in excavating, after which the bottom of the trench is well consolidated by ramming, any loose material below subgrade being replaced by sand or gravel. The material to form the subgrade is then spread over the bottom of the trench to the desired thickness and thoroughly compacted. Next, stakes are driven along the sides of the walk, spaced 4 to 6 feet apart, and their tops made even with the finished surface of the walk, which should have a transverse slope of ¼ inch to the foot for drainage. Wooden strips at least 1½ inches thick and of suitable depth are nailed to these stakes to serve as a mold for the concrete. By carefully adjusting these strips to the exact hight of the stakes they may be used as guides for the straightedge in leveling off the concrete and wearing surface. The subfoundation is well sprinkled to receive the concrete, which is deposited in the usual manner, well tamped behind a board set vertically across the trench, and leveled off with a straightedge, as shown in Fig. 1, leaving ½ to 1 inch for the wearing surface. Three-eighths inch sand joints are provided at intervals of 6 to 8 feet to prevent expansion cracks, or, in case of settlement, to confine the cracks to these joints. This is done either by depositing the concrete in sections or by dividing it into such sections with a spade when soft and filling the joints with sand. The location of each joint is marked on the wooden frame for future reference.

Care must be exercised to prevent sand or any other material, from being dropped on the concrete, thus preventing a proper union with the wearing surface. No section should be left partially completed to be finished with the next batch or left until the following day. Any concrete left after the completion of a section should be mixed with the next batch.

It is of the utmost importance to follow up closely the concrete work with the top dressing in order that the two may set together. This top dressing should be worked well over the concrete with a trowel, and leveled with a straightedge, as shown in Fig. 1, to secure an even surface. Upon the thoroughness of this operation often depends the success or failure of the walk, since a good bond between the wearing surface and concrete base is absolutely essential. The mortar should be mixed rather

stiff. As soon as the film of water begins to leave the surface, a wooden float is used, followed up by a plasterer's trowel, the operation being similar to that of plastering a wall. The floating, though necessary to give a smooth surface, will, if continued too long, bring a thin layer of neat cement to the surface and probably cause the walk to crack.

The surface is now divided into sections by cutting entirely through, exactly over the joints in the concrete. This is done with a trowel guided by a straightedge, after which the edges are rounded off with a special tool called a jointer, having a thin shallow tongue, as shown in Fig. 2. These sections may be subdivided in any manner desired for the sake of appearance.

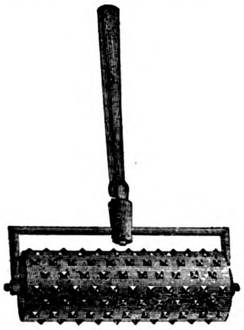


Fig. 4.—Roller Used in Finishing Surface.

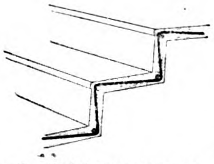


Fig. 5.—Reinforced Concrete Steps.

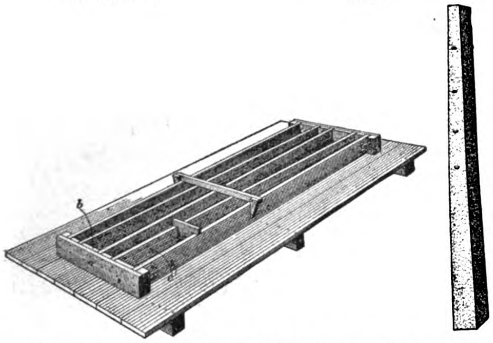


Fig. 6.—Wooden Mold for Making Fence Posts with Two Tapering Sides.

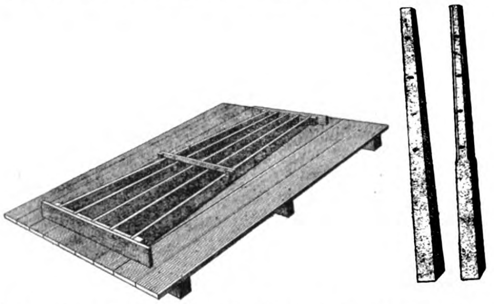


Fig. 7.—Wooden Mold for Making Fence Posts with Four Tapering Sides.

Making Concrete Walks and Posts.

A special tool called an edger (Fig. 3) is run around the outside of the walk next to the mold, giving it a neat rounded edge. A toothed roller, shown in Fig. 4 and having small projections on its face, is frequently used to produce slight indentations on the surface, adding somewhat to the appearance of the walk. The completed work must be protected from the sun and kept moist by sprinkling for several days. In freezing weather the same precautions should be taken as in other classes of concrete work.

Concrete Basement Floors.—Basement floors in dwelling houses, as a rule, require only a moderate degree of strength, although in cases of very wet basements, where water pressure from beneath has to be resisted, greater strength is required than would otherwise be necessary. The subfoundation should be well drained, sometimes requiring the use of tile for carrying off the water. The rules given for constructing concrete sidewalks apply equally well to basement floors. The thickness of the concrete foundation is usually from 3 to 5 inches, according to strength desired, and for average work a 1-3-6 mixture is sufficiently rich. Expansion joints are frequently omitted, since the temperature variation is less than in outside work, but since this omission not infrequently gives rise to unsightly cracks their use is recommended in all cases. It will usually be sufficient to divide a room of moderate size into four equal sections, separated by one-half inch sand joints. The floor should be given a slight slope toward the center or one corner, with provision at the lowest point for carrying off any water that may accumulate.

Concrete stable floors and driveways are constructed in the same general way as basement floors and sidewalks, but with a thicker foundation, on account of the greater strength required. The foundation may well be 6 inches thick, with a 1-inch wearing surface. An objection sometimes raised against concrete driveways is that they become slippery when wet, but this fault is in a great measure overcome by dividing the wearing surface into small squares about 4 inches on the side, by means of triangular grooves three-eighths of an inch deep. This gives a very neat appearance and furnishes a good foothold for horses.

Concrete Steps.—Concrete may be advantageously used in the construction of steps, particularly in damp places, such as areaways and cellars of houses; and in the open, where the ground is terraced, concrete steps and walks can be made exceedingly attractive. Where the ground is firm it may be cut away as nearly as possible in the form of steps, with each step left 2 or 3 inches below its finished level. The steps are formed, beginning at the top, by depositing the concrete behind vertical boards so placed as to give the necessary thickness to the risers and projecting high enough to serve as a guide in leveling off the tread. Such steps may be reinforced where greater strength is desired or where there is danger of cracking, due to settlement of the ground.

Where the nature of the ground will not admit of its being cut away in the form of steps, the risers are molded between two vertical forms. The front one may be a smooth board, but the other should be a piece of thin sheet metal, which is more easily removed after the earth has been tamped in behind it. A simple method of reinforcing steps is to place a ½-inch steel rod in each corner, and thread these with ¼-inch rods bent to the shape of the steps, as shown in Fig. 5, the latter being placed about 2 feet apart. For this class of work a rich Portland cement concrete is recommended, with the use of stone or gravel under ½ inch in size. Steps may be given a ½-inch wearing surface of cement mortar mixed in the proportion of one part cement to two parts sand. This system, as well as many others, is well adapted for stairways in houses.

Reinforced Concrete Fence Posts.

There is a constantly increasing demand for some form of fence post which is not subject to decay. The life of wooden posts is very limited and the scarcity of suitable timber in many localities has made it imperative to find a substitute. A fence post to prove thoroughly satisfactory must fulfill three conditions. First, it must be obtainable at a reasonable cost; second, it must possess sufficient strength to meet the demands of general farm use; third, it must not be subject to decay and must be able to withstand successfully the effects of water, frost and fire. Although iron posts of various designs are frequently used for ornamental purposes, their adoption for general farm use is prohibited by

their excessive cost. Then, too, iron posts exposed to the weather are subject to corrosion, to prevent which necessitates repainting from time to time, and this item will entail considerable expense in cases where a large number of posts are to be used.

At the present time the material which sems most nearly to meet these requirements is reinforced concrete. The idea of constructing fence posts of concrete reinforced with iron or steel is by no means a new one, but, on the contrary, such posts have been experimented with for years and a great number of patents have been issued covering many of the possible forms of reinforcement. It is frequently stated that a reinforced concrete post can be made and put in the ground for the same price as a wooden post. Of course, this will depend in any locality upon the relative value of wood and the various materials which go to make up the concrete post, but in the great majority of cases wood will prove the cheaper material, in regard to first cost. On the other hand, a concrete post will last indefinitely, its strength increasing with age, whereas the wooden post must be replaced at short intervals, probably making it more expensive in the long run.

In regard to strength, it must be borne in mind that it is not practicable to make concrete fence posts as strong as wooden posts of the same size, but since wooden posts, as a rule, are many times stronger than is necessary, this difference in strength should not condemn the use of reinforced concrete for this purpose. Moreover, strength in many cases is of little importance, the fence being used only as a dividing line, and in such cases small concrete posts provide ample strength and present a very uniform and neat appearance. In any case, to enable concrete posts to withstand the loads they are called upon to carry, sufficient strength may be secured by means of reinforcement, and where great strength is required this may be obtained by using a larger post, with a greater proportion of metal and well braced, as is usual in such cases. In point of durability concrete is unsurpassed by any material of construction. It offers a perfect protection to the metal reinforcement and is not itself affected by exposure, so that a post constructed of concrete reinforced with steel will last indefinitely and require no attention in the way of repairs.

No form of wooden reinforcement, either on the surface or within the post, can be recommended. If on the surface, the wood will soon decay, and if a wooden core is used it will in all probability swell by the absorption of moisture and crack the post. The use of galvanized wire is sometimes advocated, but if the post is properly constructed and a good concrete used, this precaution against rust will be unnecessary, since it has been fully demonstrated by repeated tests that concrete protects steel perfectly against rust. If plain, smooth wire or rods are used for reinforcement they should be bent over at the ends or looped to prevent slipping in the concrete. Twisted fence wire may usually be obtained at a reasonable cost and is very well suited for this purpose. Barbed wire has been proposed and is sometimes used, although the barbs make it extremely difficult to handle. For the sake of economy the smallest amount of metal consistent with the desired strength must be used, and this requirement makes it necessary to place the reinforcement near the surface, where its strength is utilized to greatest advantage, with only enough concrete on the outside to form a protective covering. A reinforcing member in each corner of the post is probably the most efficient arrangement.

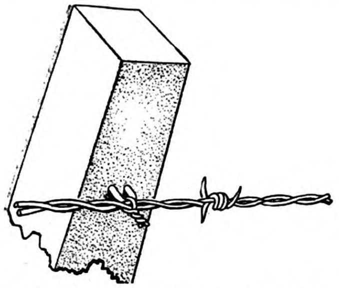


Fig. 8.—Detail Showing Method of Attaching Wire to Posts.

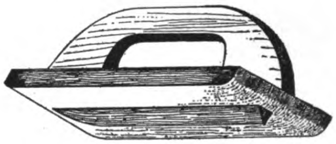


Fig. 9.—Tool Used for Beveling Edges of Posts.

Making Concrete Walks and Posts.

Concrete for Fence Posts.—The concrete should be mixed with Portland cement, in about the proportion 1—2½—5, broken stone or gravel under ½ inch being used. In cases where the aggregate contains pieces smaller than ¼ inch, less sand may be used, and in some cases it may be omitted altogether. A mixture of medium consistency is recommended on the ground that it fills the molds better, and with less tamping than if mixed quite dry.

Molds for Fence Posts.—Economy points to the use of a tapering post, which, fortunately, offers no difficulties in the way of molding. All things considered wooden molds will be found most suitable. They can be easily and quickly made in any desired size and form. Posts may be molded either in the vertical or horizontal position, the latter being the simpler and better method. If molded vertically a wet mixture is necessary, requiring a longer time to set, with the consequent delay in removing the molds. Fig. 6 shows a simple mold, which has been used with satisfactory results in this laboratory. This mold has a capacity of four posts, but larger molds could easily be made on the same principle. It consists of two end pieces (*a*) carrying lugs (*b*) between which are inserted strips (*c*). The several parts are held together with hooks and eyes, as shown in Fig. 6. To prevent any bulging of the side strips they are braced, as illustrated. Dressed lumber at least 1 inch thick, and preferably 1½ inches, should be used. In Fig. 6 the post measures 6 x 6 inches at the bottom, 3 x 6 inches at the top and 7 feet in length, having two parallel sides. If it is desired to have the posts square at both ends the mold must be arranged as in Fig. 7. This latter form of post is not as strong as the former, but requires less concrete in its construction. Great care in tamping is necessary to insure the corners of the mold being well filled, and if this detail is not carefully watched, the metal, being exposed in places, will be subject to rust.

Attaching Fence Wires to Posts.—Various devices have been suggested for attaching fence wires to the posts, the object of each being to secure a simple and permanent fastener or one admitting of easy renewal at any time. Probably nothing will answer the purpose better than a long staple or bent wire well embedded in the concrete, being twisted or bent at the end to prevent extraction. Galvanized metal must be used for fasteners, since they are not protected by the concrete. A piece of small flexible wire, about 2 inches in length, threading the staple and twisted several times with a pair of pliers, holds the line wire in position, as shown in Fig. 8.

Molding and Curing Posts.—It has been demonstrated that concrete can be mixed by machinery as well, if not better, than by hand. Moreover, if large quantities of concrete are required, a mechanical mixer introduces marked economy in the cost of construction. None of the various forms of mechanical mixers will be described here, since concrete in small quantities, as would be used on the farm, is more economically mixed by hand.

In mixing concrete by hand a platform is constructed as near the work as is practicable, the sand and aggregate being dumped in piles at the side. If the work is to be continuous this platform should be of sufficient

size to accommodate two batches, so that one batch can be mixed as the other is being deposited. The cement must be kept under cover and well protected from moisture. A convenient way of measuring the materials is by means of bottomless boxes or frames made to hold the exact quantities needed for a batch.

A very common and satisfactory method of mixing concrete is as follows: First measure the sand and cement required for a batch and mix these into mortar. Spread out this mortar in a thin layer and on top of it spread the aggregate, which has been previously measured and well wetted. The mixing is done by turning with shovels three or more times, as may be found necessary to produce a thoroughly uniform mixture, water being added if necessary to give the proper consistency. The mixers, two or four in number, according to the size of the batch, face each other and shovel to right and left, forming two piles, after which the material is turned back into a pile at the center. By giving the shovel a slight twist, the material is scattered in leaving it and the efficiency of the mixing is much increased.

A dry mixture, from which water can be brought to the surface only by vigorous tamping, is probably the strongest, but for the sake of economy and to insure a dense concrete well filling the molds a moderately soft mixture is recommended for ordinary purposes. Where the pieces to be molded are thin, and where small reinforcing metal rods are placed close together or near the surface, a rather wet mixture may be necessary to insure the molds being well filled.

It is recommended that only so much concrete be mixed at one time as can be used before it begins to harden, but if an unavoidable delay prevents the posts being molded until after the concrete has begun to set it is thought that a thorough regaging with sufficient water to restore normal consistency will prevent any appreciable loss of strength, though the concrete may have been standing one or two hours. In using a mold similar to those illustrated in Figs. 6 and 7 it is necessary to provide a perfectly smooth and even platform of a size depending upon the number of posts to be molded. A cement floor if accessible may be used to advantage. The molds when in place are given a thin coating of soft soap, the platform or cement floor serving as bottom of mold being treated in the same way. About 1½ inches of concrete is spread evenly over the bottom and carefully tamped, so as to reduce it to a thickness of about 1 inch. A piece of board cut as in Fig. 6 will be found useful in leveling off the concrete to the desired thickness before tamping. On top of this layer two reinforcing members are placed about 1 inch from the sides of the mold. The molds are then filled and tamped in thin layers to the level of the other two reinforcing members, the fasteners for fence wires being inserted during the operation. These reinforcing members are adjusted as were the first two, and the remaining 1 inch of concrete tamped and leveled off, thus completing the post, so far as molding is concerned. To avoid sharp edges which are easily chipped triangular strips may be placed in the bottom of mold along the sides, and when the molds have been filled and tamped similar strips may be inserted on top. The top edges may be beveled with a trowel or by running an edging tool having a triangular projection on its bottom along the edges. Such a tool is shown in Fig. 9 and can easily be made of wood or metal. It is not necessary to carry the bevel below the ground line.

The ends and sides of the mold may be removed after twenty-four hours, but the posts should not be handled for at least one week, during which time they must be well sprinkled several times daily and protected from sun and wind. The intermediate strips may be carefully withdrawn at the end of two or three days, but it is better to leave them in place until the posts are moved. Although a post may be hard and apparently strong when one week old, it will not attain its full strength in that length of time and must be handled with the utmost care to prevent injury. Carelessness in handling green posts frequently results in the formation of fine cracks, which though unnoticed at the time give evidence of their presence later in the failure of the post.

Posts should be allowed to cure for at least sixty days before being placed in the ground, and for this purpose it is recommended that when moved from the molding platform they be placed upon a smooth bed of moist sand and protected from the sun until thoroughly cured. During this period they should receive a thorough drenching at least once a day.

The life of the molds will depend upon the care with which they are handled. A coating of mineral oil or shellac may be used instead of soap to prevent the cement from sticking to the forms. As soon as the molds are removed they should be cleaned with a wire brush before being used again.

The cost of reinforced concrete fence posts depends in each case upon the cost of labor and materials and must necessarily vary in different localities. An estimate in any particular case can be made as follows: One cubic yard of concrete will make 20 posts measuring 6 inches by 6 inches at bottom, 6 inches by 3 inches at top and 7 feet long, and if mixed in the proportions 1—2½—5 requires approximately:

1.16 barrels of cement, at $2	$2.32
0.44 cubic yard of sand, at 75 cents	.33
0.88 cubic yard of gravel, at 75 cents	.66
Materials for 1 cubic yard concrete	$3.31
Concrete for one post	$0.17
28 feet of 0.16-inch steel wire, at 3 cents per pound	.06
Total cost of concrete and metal for one post	$0.23

To this must be added the cost of mixing concrete, molding and handling posts, and the cost of molds, an addition which should not in any case exceed 7 cents, making a total of 30 cents per post.

Apropos of the San Francisco Disaster.

A very thoughtful and somewhat extended consideration of the new San Francisco appeared in a recent issue of *The London Architect*, the article concluding with the following paragraph:

"In the earthquake at Lisbon in 1775 it was found that the most solid buildings were the first to fall. Every parish church, convent, nunnery and public edifice was either thrown down or shattered. Both the king and the people were in such despair that a long time must have elapsed before any efforts were made for the removal of the ruins if it were not for the extraordinary energy of Pombal, the minister. It now seems mysterious that Pompeii, which at one time was believed to be essential to the existence of well to do Romans, was allowed to remain for nearly 1700 years without any effort to remove the lava. Some of the inhabitants may have returned in order to carry off such treasures as were obtainable. But no attempt was made to restore the city. With all their energy the Romans seem to have been paralyzed by the spectacle, or to have accepted it as if it were an inevitable fatality for which there was no remedy. At the time of the fire of London, which foreigners seemed to think was a judgment from Heaven, the citizens made no efforts to quench it, but ran about screaming as if they were distracted. If it were not for the garrulous Pepys, who wrung from the king authority to pull down houses in order to isolate the fire, the destruction would have been far greater. With such examples before us the conduct of the Americans becomes heroic and demonstrates at least that the vigor of some races of humanity has not deteriorated under modern influences."

◆

Another modern structure which will mark what was not long ago considered the select residential section of Fifth avenue, New York, is the 16-story business building, having a frontage of 70 feet on the avenue and a depth of 100 feet, which is about being erected in the center of the block between Thirty-third and Thirty-fourth streets, directly opposite the well-known Waldorf-Astoria Hotel. The plans, which have been prepared by Architects Maynicke & Franke, call for a façade of granite, limestone and brick. The building is being put up for the Union Trust Company as trustee for the Estate of Laura A. Delano. At present the old buildings are being torn down in order to make way for the new edifice.

Carpentry and Building

WITH WHICH IS INCORPORATED

THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

JUNE, 1906.

Steel Frame Buildings Earthquake Proof.

The calamity through which the greater portion of the city of San Francisco has been destroyed, entailing a tremendous loss of property and hundreds of lives—just how many will probably never be known—has awakened the keenest interest in the building world as to the form of construction that will best withstand the effects of fire and earthquake shocks. In the city were a number of modern structures, some having been completed only a few years, while others were in process of erection; these being for the most part of the well-known steel cage type, with incasing masonry of brick or stone. At the time of the great Baltimore fire it was generally conceded that the steel skeleton frame construction was subjected to a test more severe than it had ever before been called upon to endure, but in the San Francisco disaster not only were the buildings subjected to the ravages of a fierce conflagration, but to the unparalleled test of a series of earthquake shocks. It was quite natural therefore that prominent architects, builders and committees of experts interested in fireproof construction should desire to visit the ruins with a view to studying the effects of the fire and earthquake shocks and noting some of the lessons obviously to be drawn from such a trying ordeal as the disaster in question. While the reports of the experts are not fully available at this time, enough is known to warrant the statement that the steel skeleton construction has been again vindicated, and in a way to carry conviction to the most skeptical. According to the report of our special correspondent, presented elsewhere in this issue, the new Monadnock Building, a modern steel frame structure in process of erection, withstood not only the earthquake shock and the conflagration which raged thereafter, but also the explosions of dynamite which were made with a view to checking the progress of the flames. In the case of the Merchants' Exchange Building, constructed last year with steel frame and pressed brick, there was so little damage that it was in part ready for occupancy the first week in May, the only important injury to the frame work being a slight buckling of the steel beams at the sixth floor. In the case of the ten-story Kohl Building, erected three years ago of sandstone and steel, little or no damage resulted above the fourth floor, and, strange as it may seem, some of the windows remained intact through all the fire and shock of the disaster. The satisfactory manner in which these and other buildings of the modern type of construction passed through the trying ordeal renders it extremely likely that in the rebuilding of the city this style will be utilized to a very large extent, especially in connection with office buildings and others used for business purposes. It is quite probable too that reinforced concrete will play an important part in the new construction. Just what effect the test of the San Francisco steel structures will have on the future of skyscraping buildings outside of the earthquake zone remains to be seen. Great inconvenience naturally is being experienced by the extensive derangement of business arising from the terrible disaster, but judging from the admirable attitude displayed by the citizens of the city and surrounding country, where the earthquake shocks were also felt to a greater or lesser extent, matters will in due course be righted and a new city more beautiful and more substantial than the old will rise from the ashes of the one just destroyed.

Cost of Building Construction.

It is the frequent plaint nowadays on the part of the prospective builder that building costs so much more than it used to. It is usually conceded without question that the reason for this increase is the increased cost of materials and labor. However much this may be, there is certainly a point which is frequently overlooked, and this is that people are not satisfied to-day with the things that satisfied them ten years ago. The preference is, for example, for the modern plumbing fixtures as compared with the tin bathtub and rapidly antiquated plumbing of a decade ago. The average house builder is a little more exacting as to the general proportions and conveniences of his building than he used to be. To be sure, the additional expense of these added conveniences and better materials does not necessarily figure materially in proportion to the total cost of a dwelling, but it has its effect. There is the contention among some who have studied the question that labor nowadays, when unrestricted by union organizations as to output, can do a sufficiently great amount of work so that the unit cost of labor is little if any greater than it was under the wage rates that were lower than those now current. This is in a way saying that the increase in the present rate of wages is offset by the increased capacity of the present day workman under the best conditions. The increased cost of materials is in turn offset, at least in part, in the opinion of these same students of the subject, by better and more economical methods of building in vogue to-day. With the application of the ideas of engineering to building construction an economy of materials has resulted and a higher efficiency of operation has been effected, points which, of course, are involved in any definition of engineering. The final point, therefore, is that the higher cost of labor is offset at least in part by higher efficiency of workmen, that the higher cost of materials is more or less offset by economy in building, with the result that the increased present high cost of building is attributable mostly to the exacting desires of the present day. With all this said, however, it is important to note from several articles on the subject which we have presented in these columns in the last few months that the actual cost of building has, during the past five years, shown a decided advance in practically every item entering into construction work, the aggregate being in the neighborhood of 40 per cent.

A Unique Office Building.

What will rank among the most unique of the many towering office buildings in the Borough of Manhattan, N. Y., more especially in the financial district, is the 18-story office tower now in course of erection on the site of the old four-story Silliman Building, at the southeast corner of Broadway and Wall street. The plans, which have just been filed with the Bureau of Buildings, call for a steel skeleton structure filled with brick, trimmed with terra cotta, and to be erected on steel pile foundations, surrounded with reinforced concrete. The site occupied is one of the smallest yet most valuable in

CARRIAGE HOUSE AND STABLE OF MR. W. E. JONES, WAVERLEY AVENUE, NEWTON, MASS.

KILHAM & HOPKINS, ARCHITECTS

SUPPLEMENT CARPENTRY AND BUILDING, JUNE, 1906

RESIDENCE OF MR. ROBERT S. GORHAM ON EXETER STREET, NEWTON, MASS.

LORING & PHIPPS, ARCHITECTS

SUPPLEMENT CARPENTRY AND BUILDING, JUNE, 1906

the city, the Broadway frontage being only 29.1 feet, and that on Wall street 39.3 feet. The building is to be 217 feet in hight and it will be lighted by three rows of windows on each front. The drawings, which have been prepared by Barnett, Haynes & Barnett, of St. Louis, Mo., show a curious construction, in that each floor will contain a single office opening directly upon the three passenger elevators with which the tower is to be equipped. In addition to the elevators, access to the offices will be afforded by means of a fireproof staircase 3 feet wide, extending from the subbasement to the roof. The elevator shafts on the office side will be enclosed with ribbed wired glass so as to insure privacy to the tenants of the offices. The entrance will be at the north end of the Broadway front and will be decorated with granite pedestals, surmounted with bronze pillars bearing electric lamps. The building is being erected by a St. Louis concern, and it is expected to be ready for occupancy by the first of the coming year. While the cost of the structure exclusive of the land is placed at only about $250,000, its location and construction will make it an object of interest to visiting builders.

◆

Cost of Building in Massachusetts.

The question of the cost of building in various sections of the country is one of unusual interest just at this time, when prices of materials entering into building construction, together with the labor required to do the work, are showing an advancing tendency. A short time ago we published in these columns some figures showing the increased cost of materials and labor in and about New York City as compared with 1898, and which in many respects would apply to other sections. These figures indicated a marked advance all along the line and clearly demonstrated that a trifle over 30 per cent. more capital was required to erect a structure at that time than it did at the date specified. Now comes the Boston *Commercial Bulletin with figures* showing the advances which have occurred in the cost of building materials and labor in Massachusetts for the five years ending with 1906, and a few extracts from what it presents in a recent issue cannot fail to be of interest to architects, contractors and prospective houseowners the country over. It points out that a considerable portion of the increased cost of many of the items is due to the higher wages paid to labor in the industries producing those materials. In virtually all branches the output of which is necessary to builders there has been an advance in the wages of both skilled and unskilled labor, and coordinate increases in wages are also being paid workmen concerned directly in the building industry itself.

The authority in question refers to the fact that the Massachusetts Bureau of Statistics of Labor in recent special bulletins gives, after a careful canvass, some statistics touching wages per hour in the State named, from which we quote as follows:

	1901.	1904.	1906.
Bricklayers	$0.47	$0.50	$0.55
Carpenters	.25	.28	.30
House painters	.30	.34	.35
Plasterers	.47	.50	.50
Plumbers	.44	.44	.50
Roofers (gravel)	.30	.33	.34
Roofers (slate)	.36	.36	.40
Sheet metal workers	.33	.37	.37

From these figures and from statistics on the value of materials taken from the files of the *Commercial Bulletin*, it appears that, reduced to a percentage basis, the entire advances have been as follows:

Percentage of Advance from 1901 *to* 1906.

Materials.	Per cent.
Spruce, ordinary frames	47
Spruce, 10 and 12 inch diameter	42
Spruce, matched boards	29
Shingles, cedar, extras	29
Clapboards, spruce, 4-foot, extras	33
Laths, 1½-inch	39
Oak, quartered, 1-inch	28
Oak, plain, white, 1-inch	27
Whitewood, 1-inch	37
Maple, 1-inch	22
Ash, brown, 1-inch	31
White pine, Michigan uppers, 1-inch	39
Cypress, 1-inch	35
Bricks	29
Lime	15
Cement	25
Steel beams and channels, 3 to 15 inch	5
Steel beams and channels larger than 15-inch	5
Angles, 3-inch and larger	5
Average advance on materials	27½
Labor.	**Per cent.**
Bricklayers	17
Carpenters	20
House painters	17
Plasterers	6
Plumbers	14
Roofers (gravel)	13
Roofers (slate)	11
Sheet metal workers	12
Average advance on labor	13¾

It will be seen by the above that an average advance of 27½ per cent. has taken place on building materials in the past five years, as compared with an advance of 13¾ per cent. in the wages of the laborers utilizing them. The advances in materials include the increases in wages for the operatives producing these materials, and assuming that the laborers producing these materials averaged to secure the same percentage of increase in wages as our table shows that the building laborers secured, that is 13¾ per cent., and deducting this from the 27½ per cent. advance in the value of these materials, there remains a balance of 13¾ per cent., representing the assumed advance in material itself. The assumption, hence, appears to be a fair one that the capital and labor have in these instances shared equally in the prosperous conditions affecting the building trade during the past five years.

Canclusions.

It appears, then, that building materials have advanced 27½ per cent. and that labor has advanced 13¾ per cent. Two other elements remain to be considered. These are the architects and the contractors. In the case of architects a commission is customarily charged varying from perhaps 2½ to 10 per cent. on the values of the buildings for which they draw plans. As their profits increase in a direct ratio with any increased cost of building, there has probably been little advance in their charges beyond what has naturally come to them in this manner. Taking 5 per cent. as an average architect's commission, the increase coming to them owing to the advanced cost of 41¼ per cent. on materials and labor would equal about 2 per cent. Contractors usually figure on about the same basis as architects, although most of them hide the percentage behind a fixed charge. It is fair, it seems to us, however, to use the same percentages for them as for architects.

The total advances, then, in the past five years in the cost of building may be estimated as follows:

Average Advances, 1901-1906.

	Per cent.
Building materials	27½
Building labor	13¾
Architects' fees	2
Contractors' charges	2
Total	45¼

◆

Our Supplemental Plates.

Accompanying this issue we present two interesting studies, one showing an attractive residence with shingled exterior, while the other is a stable and carriage house with picturesque surroundings, and involving features likely to interest both the architect and the builder. The residence is that of Robert S. Gorham, located on Exeter street, Newton, Mass., and was erected according to drawings prepared by Loring & Phipps of Boston. The stable and carriage house is that of W. E. Jones on Waverly avenue, Newton, and was designed, together with the residence of Mr. Jones, by Kilham & Hopkins, also of Boston, Mass.

◆

THE statement is made that all records in construction in Denver, Col., were broken by the contractors in putting up the annex to the Albany Hotel in that city the present spring. The structure is seven stories in hight and affords accommodations for stores and large banquet hall on the first floor and 125 rooms on the floors above. Ground was broken for the edifice on January 4, and the building was under roof April 20. The bricklayers began work February 22, and the superstructure arose in exactly 32 days. It is expected to have the annex furnished and ready for occupancy by the first of July.

CORRESPONDENCE.

Rapid Shingling Methods and Appliances.

From C. B. J., *Oregon City, Ore.*—I notice in a recent issue that "L. H. H." appears to be in more or less pain over the statement of "Western Builder" that he can do a day's work. Now, there are lots of carpenters out here in the wild and woolly West who have not been subjected to the restricting influence of unionism and who can still do a day's work. I fail to notice any rash statement made by "Western Builder." I have been employing men for a good many years and find a great difference in individuals. For instance, I have had men who in fitting doors would saw a notch in a board and strain it in between the jambs to hold the door while planing it to fit; that man is behind the times. Another man will set his jambs so that he has to rip ¼ inch off the door and the sash the same—all lost time. I find the Western carpenter quite a bit more previous than the denizen of the effete East. No proficient shingler thinks of monkeying with a chalkline or 2 x 4 on the roof to keep from falling off. The up to date shingler has a hatchet with a gauge set to 4 inches, 4½ inches or 5 inches; also a seat, and nails on 5 to 10 courses or more at a time. He does not cover the roof with 2 x 4 and fool away the time of the contractor constructing chalk lines. I have a man who carried up 10 M. shingles on a roof and the next day nailed on every one of them. Now, "L. H. H.," when you read this, don't let that pain become chronic. Of course no live man can put that many shingles on a roof broken by valleys and hips. I am a dead slow man myself, and when I fit and put mortise locks on eight doors in eight hours I am satisfied with myself.

I inclose sketches of the shingling hatchet and gauge, also seat, for the benefit of "H. S. G." The head of the hatchet is used to shove the shingle into position and the gauge catches onto the butt of the previous course which has been laid. I notice "L. H. H." calls it a "perch" or "stool." That is where he makes his mistake, and when he used it in '73 he thought he was milking a cow, but was milking the contractor. I think "Western Builder" owes me a debt of gratitude for this diversion in his favor.

I find very few journeymen take a building paper, but permit me to say it is just as necessary for them to study as for the lawyer or contractor. The lack of study is the reason why so many are behind in all the little kinks of the trade. In conclusion I would state that *Carpentry and Building* is the best paper that comes to my table.

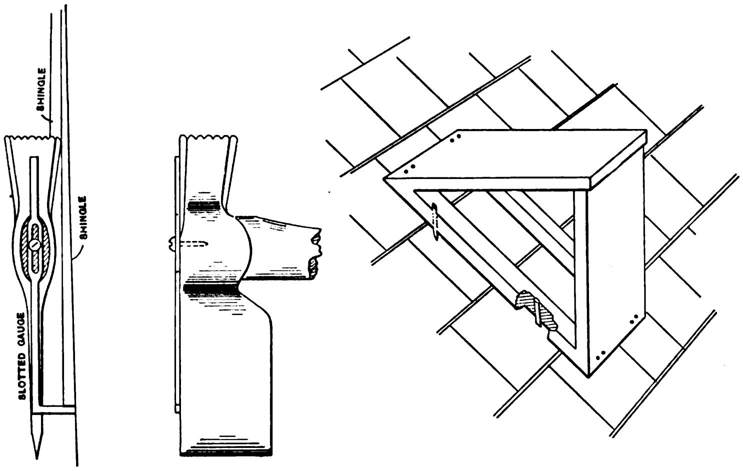


Fig. 1.—End View. Fig. 2.—Side View. Fig. 3.—Section of Roof, Showing "Seat."

Rapid Shingling Methods and Appliances.

Patent Plaster and Metal Lath Construction.

From H. E. T., *Willoughby, Ohio.*—I note the inquiry in regard to the action of patent plaster and metal lath construction and it may not be without interest for me to state that I have used wood pulp plaster on several small dwellings, ranging in cost from $1200 to $2500, with very satisfactory results. The material is easily handled, dries so quickly that in moderately dry warm weather the finish, that is the casings, may be put on with perfect safety the third day after plastering. Where wall paper is to be used it does not require a white or putty coat, but can be put on in two coat work, troweled to a perfectly smooth hard coat to which paper will stick very tenaciously. The plaster also adheres to the lath stronger than any other plaster with which I am acquainted. In some sections it is not used so much, as "Adamant" is preferred. I have heard considerable criticism of this plaster as to its corrosive effects, staining and other objectionable properties, also that it would decay in a few years and fall off from the lath. To all of this I can say that practical experience in this vicinity proves these to be false theories. I consider this plaster far ahead of any sand or grout plaster, where the walls are liable to be punctured or bruised, for it will not be continually sifting down on the floor. The only fault I can find with it is its ability to transmit sound. There are like all other good things several cheap and worthless brands of this plaster on the market, which are merely imitations of the real thing. At the present writing I cannot give the names of the best brands, but they can doubtless be obtained from reliable dealers. I would like to hear from other readers of the paper in regard to this and other patent plasters, also as to their action on sheet metal lath. The subject is one which appears to me to permit of considerable discussion, and if every one interested will ventilate his views much valuable information should be forthcoming.

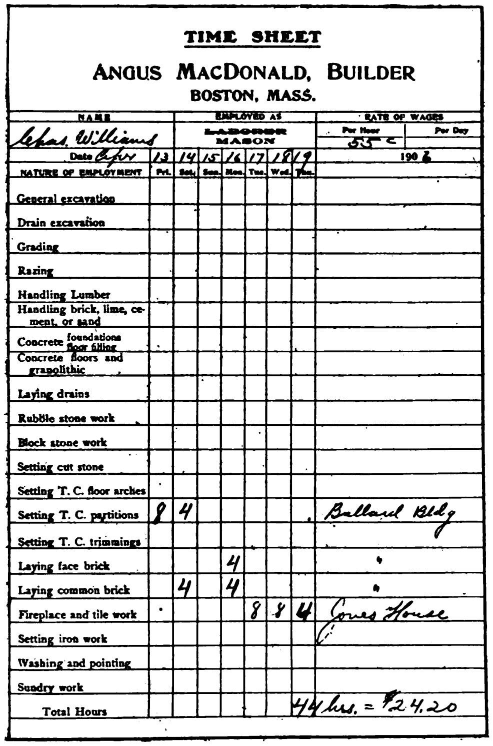
System in Estimating.

From A. W. J., *Boston, Mass.*—I was an interested reader of Frank G. Odell's comments on estimating in his article on "Laying and Finishing Hardwood Floors," in the April number of *Carpentry and Building*. As I have been estimating all kinds of buildings met with in general contracting in Boston and surrounding country for the last ten years, I feel competent to make some remarks on the subject. Mr. Odell's reference to the lack of association among builders, I am sorry to say, is a fact, and is in a great measure responsible for low prices and the "hit or miss" method of estimating prevailing. So far as I know, there are very few builders who make any systematic attempt to tabulate the results of labor as a guide to future estimating. One very good reason for this is the cost that would be entailed by doing so. Profits are

meager enough now without adding to the office expense, where the additional cost of above tabulation would come in. Nothwithstanding this, in self-protection a man should gather all of the data possible for future reference, and it can be accomplished without any material added cost.

In our business we use time sheets, samples of which I inclose, to gather the necessary information upon which to figure out the cost per unit of various items met with in construction. These slips I have arranged after much thought and study on the subject, and we have used them now for about three years with satisfactory results. One slip, Fig. 1, you will see, is marked "Mason and Laborer." In using this slip for a mason we draw a line through laborer and for a laborer through mason.

The other slip, Fig. 2, is arranged for carpenters. On a job employing 15 or more men we employ a timekeeper, usually some young man who has worked at some branch of the building trade or in an architect's office, paying for his services from $9 to $12 per week. With instructions from the office or the foreman from time to time, it is possible to keep the time very accurately, divided according to headings. On small jobs, where a timekeeper is not employed, the foreman keeps the time slips. On jobbing each man keeps his own time slip. It is then an easy matter at the end of a job to work out the unit price, when your books show just how much of the various materials have been used on the job.



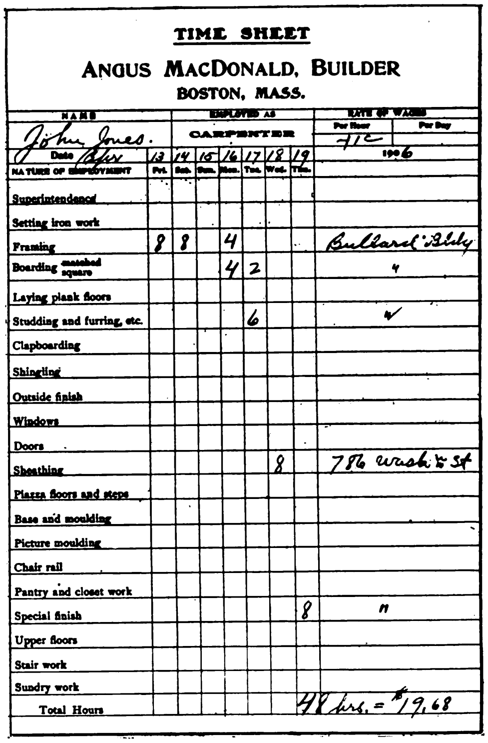
TIME SHEET

ANGUS MACDONALD, BUILDER
BOSTON, MASS.

NAME	EMPLOYED AS	RATE OF WAGES Per Hour	Per Day
Chas. Williams	~~LABORER~~ MASON	55 c	

NATURE OF EMPLOYMENT	Fri.	Sat.	Sun.	Mon.	Tue.	Wed.	Thu.	
Date Apr	13	14	15	16	17	18	19	1906
General excavation								
Drain excavation								
Grading								
Razing								
Handling Lumber								
Handling brick, lime, cement, or sand								
Concrete foundations floor filling								
Concrete floors and granolithic								
Laying drains								
Rubble stone work								
Block stone work								
Setting cut stone								
Setting T. C. floor arches								
Setting T. C. partitions	8	4						Ballard Bldg
Setting T. C. trimmings								
Laying face brick				4				"
Laying common brick		4		4				"
Fireplace and tile work					8	8	4	Jones House
Setting iron work								
Washing and pointing								
Sundry work								
Total Hours							44 hrs. = $24.20	

Fig. 1.—Time Sheet for Mason and Laborer.



TIME SHEET

ANGUS MACDONALD, BUILDER
BOSTON, MASS.

NAME	EMPLOYED AS	RATE OF WAGES Per Hour	Per Day
John Jones.	CARPENTER	41c	

NATURE OF EMPLOYMENT	Fri.	Sat.	Sun.	Mon.	Tue.	Wed.	Thu.	
Date Apr	13	14	15	16	17	18	19	1906
Superintendence								
Setting iron work								
Framing	8	8		4				Bullard Bldg
Boarding matched square				4	2			"
Laying plank floors								
Studding and furring, etc.					6			"
Clapboarding								
Shingling								
Outside finish								
Windows								
Doors								
Sheathing						8		786 Wash St
Piazza floors and steps								
Base and moulding								
Picture moulding								
Chair rail								
Pantry and closet work								
Special finish							8	"
Upper floors								
Stair work								
Sundry work								
Total Hours							48 hrs. = $19.68	

Fig. 2.—Time Sheet for Carpenters.

System in Estimating—Time Slips Submitted by "A. W. J."

There is such a difference in men, and in fact in the same man on different days, that to be of much use the tabulation of the labor must be continued for some time before you can get fair averages. I have always contended that estimating the cost of any kind of a structure was quite as much a matter of judgment as of mathematics. It makes a great deal of difference in quantities of material who is using them. Some otherwise good foremen have absolutely no idea of the value of stock, and on some jobs that have come under my observation I have seen enough stock wasted to use up all that the contractor had allowed for profit in figuring the job. Then, on the other hand, the foreman who uses his stock all up to good advantage, having the minimum amount of waste, does not get the work he should out of his men.

I do not mean by the above argument that there are not men who combine both the qualities of using up their stock as they should and getting a large amount of work out of the men, for they do exist, but they are not so numerous that you can always put your hand on them when you want one.

The weather also is a great factor in building, and circumstances of site enter the problem, too. All of these things have to be taken into account and settled by judgment; although the tabulation of facts obtained from your jobs if continued will so school your judgment as to make you expert in grasping the situation at a glance when looking over the plans and site preparatory to submitting a proposal.

I have been at work for some time on a treatise on estimating of structures, handling the matter somewhat differently from any work yet published on the subject, and hope to be able to find time to complete it soon and put it before the readers of this paper. I felt impelled by Mr. Odell's remarks on the subject to say something at this time, and trust that some of the many readers of this paper may derive some profit from same, brief and incomplete though it is.

As affording an example of the manner in which the time slips are used, I have filled out one of each kind, and would mention that by the arrangement of the slips here shown we end our week with Thursday night.

Censorship of Correspondence.

From P. C. D., *Fryeburg, Maine.*—Since reading the article of "Hee H. See," in the May issue of the paper in regard to a censorship of correspondence, as suggested by "O. M. T." in the March number, I have read the latter's suggestion a second time, and see no reason for thinking that "O. M. T." asked for censorship of all articles sent in for publication, but thought correction should be made when the information was wrong or misleading. Certainly that was my understanding of it

when I indorsed it, but I think we can trust the editor to make corrections in such a way that the writer will not feel hurt.

Replies to Requests for Roof Plans.

From J. F. J., *Nokomis, Ill.*—Being a subscriber and an interested reader of *Carpentry and Building*, I take this opportunity of answering the requests of "C. K. S.," Wayland, Iowa, and of "J. C. L.," Hammond, Ind., for roof plans. In the diagram, Fig. 1, is shown the plan of a roof with gables for "C. K. S.'s" house, and in Fig. 2 the plan of a roof with hips, which I think will make a satisfactory job. I also send a plan for the house of "J. C. L.," showing a hip roof, or he may have three gables, as shown on the plan, if he so desires.

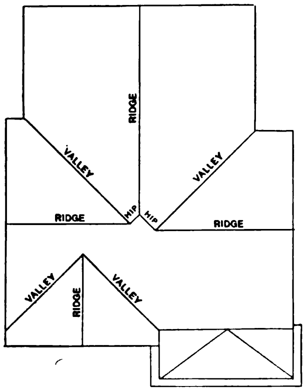


Fig. 1.

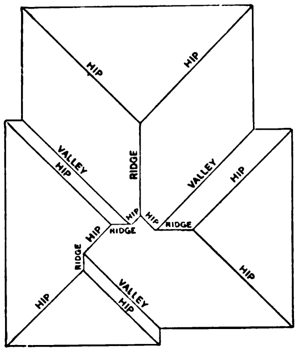


Fig. 2.

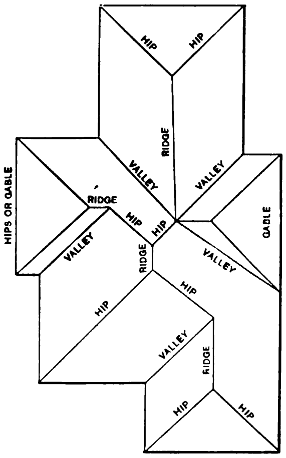


Fig. 3.

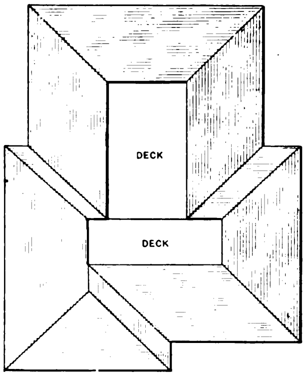


Fig. 4.

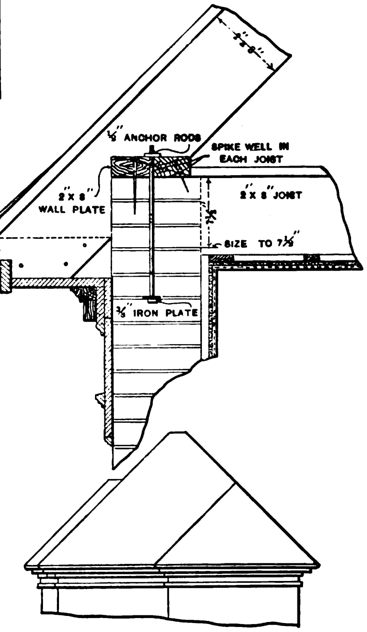


Fig. 5.

Replies to Requests for Roof Plans—Contributed by Various Correspondents.

Note.—The plan submitted by the above correspondent for the house of "J. C. L." is the same as we show in Fig. 8 of the diagrams presented herewith.

Plans similar to that shown in Fig. 2 have been received from "C. W.," Mount Vernon, Ohio, and from "U. W. D.," Columbus, Ohio.

From C. W., *Mount Vernon, Ohio.*—The roof plan shown in Fig 3, is intended as a reply to the request of "J. C. L.," Hammond, Ind., whose inquiry appears in the April issue. The correspondent might if he desires have a deck about the center of the roof, where the short hips and ridge meet. In Fig. 4 I show a roof plan for the benefit of "C. K. S.," Wayland, Iowa.

From A. P. L., *Schenectady, N. Y.*—In answer to the inquiry of "J. C. L.," Hammond, Ind., I send herewith an outline, Figs. 5 and 8, of the roof for his plan, constructed with hips and valleys, and showing how it is possible without gables. I also send a section of the roof framing and cornice, Fig. 5, to a scale of ¾ inch to the foot. I submit these sketches in the hope that they may assist the correspondent to a solution of his roof problem.

From L. K., *Cragsmoor, N. Y.*—The roof plan shown in Fig. 6 is sent in answer to the request of "C. K. S.," Wayland, Iowa, which appears on page 135 of the April issue of the paper. The corner marked X projects below the eaves of the rest of the roof. If the correspondent prefers gables instead of hips he can extend the ridges as indicated by the dotted lines.

The plan shown in Fig. 7 is in answer to the query of "J. C. L.," Hammond, Ind., in the same issue of the paper. The valley at X may be an objection, but I see no other way to frame the roof and have all the slopes half pitch. If this plan is used the valley X should be given as much pitch as hips and plenty of tin should be used in the flashing.

From L. P., *Cincinnati, Ohio.*—Answering the inquiry of "C. K. S.," Wayland, Iowa, I offer in Fig. 9 a suggestion for his roof plan and in Fig. 10 a plan and elevation of roof for "J. C. L.," Hammond, Ind.

Finding Lengths of Rafters by Bridge Measurement.

From Morris Williams, *Scranton, Pa.*—In the April issue of the paper "J. T.," Trenton, N. J., applies for information regarding the method of finding the length of rafters by bridge measurement when the run contains a fractional part of a foot. The roof he has to put up we are told has a run of 15 feet 4½ inches; and a pitch rising 7⅝ inches to the foot run. We first find the bridge measure of the pitch for 1 foot of run by laying a 2-foot rule on the square diagonally from 12 on the blade to 7⅝ on the tongue. The rule will indicate 14¼ inches, which reduced to decimals will equal 14.25. The run, 15 feet 4½ inches, reduced to decimals will equal 15.37. To find the length of the common rafter we multiply

14.25—the bridge measure for 1 foot—by 15.37, the total run of the rafter, which equals 219.0225 ÷ 12 = 18 feet 3 inches, the length of the common rafter.

To find the length of the hip or valley the 2-foot rule is placed diagonally on the square from 17 on the blade to 7⅝ on the tongue, which measures 18⅝. This reduced to decimals is 18.62, and multiplied by 15.37—the run of the common rafter—gives the length of the hip or valley 23 feet 10⅛ inches.

I would say to "J. T." that the bridge method as here exemplified is not the best for such a roof as the one he has to put up, for it calls for too much figuring. The common method of stepping along the timber with the square would be better. Taking 12 on the blade and 7⅝ on the tongue and stepping 15 times, with the addition of the fractional 4½ inches, will give one length of the common rafter; then 17 on the blade and 7⅝ on the tongue and stepping 15 times, with the addition of the proportional inches, will give the length of the hip or valley. The proportion of fractional inches for the hip or valley in this case would be 6⅝ inches.

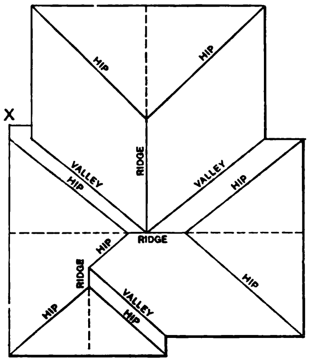


Fig. 6.

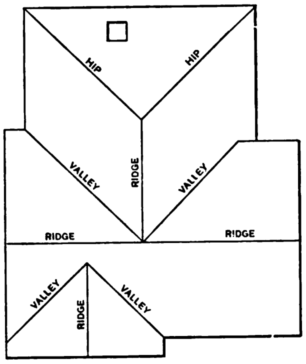


Fig. 9.

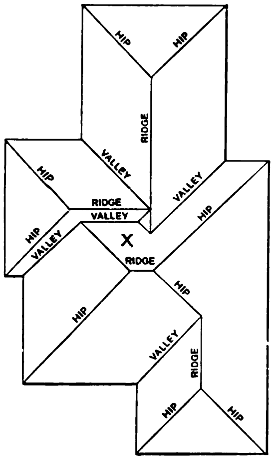


Fig. 7.

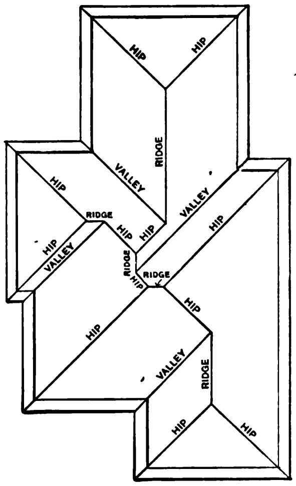


Fig. 8.

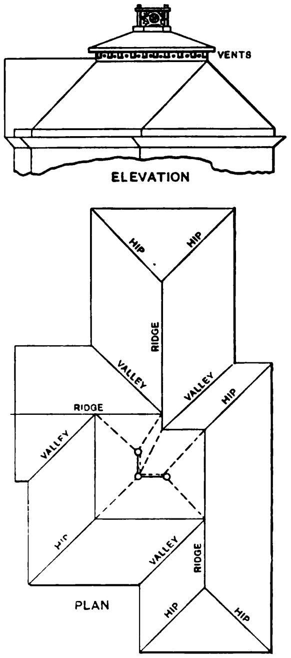


Fig. 10.

Replies to Requests for Roof Plans—Contributed by Various Correspondents.

From J. A. C., *Whittier, Cal.*—In answer to "J. T." of Trenton, N. J., as to the method of obtaining the lengths of hip and jack rafters I will describe my plan, which is simple and practical, as no other tools are needed than the steel square and a sharp knife. The method is one which I think it well for any ordinary carpenter to learn who does not wish to go into scientific figures and who does not care to learn any more than is absolutely necessary in order to do the work. As the pitch of his roof is 7⅝ to the foot, we first find the distance diagonally from 7⅝ on the tongue of the square to 12 on the blade, which is 14¼. Lay the square on a straight edged board using 14¼ on the tongue and 12 on the blade, scribe with a sharp knife on the blade side, continuing to the full width of the board, which should be about 18 inches wide. This scribed line will be the hip. Now measure 15 inches and 4½ twelfths along the edge of the board from the scribe, which will give the seat of the common rafter. Scribe up from the seat of the common rafter until it intersects the hip line, and the result is the common rafter. The distance gives the length of the common rafter, which is 18 feet 3½ inches. The length of the hip is obtained in the same way, the result being practically 23 feet 11½ inches. The lengths of the jacks can be found the same way, by measuring back the distance they are to be placed apart, scribing lines to the hip line, the length being obtained as in the case of the common rafter. The bevels or top cuts of the jack rafters are always found by using the figures as first employed; that is in the present case 12 on the blade and 14¼ on the tongue, marking on the tongue side.

If the correspondent wishes to be accurate in obtaining the top cut of the hip rafter to fit the ridge board, measure diagonally from 14¼ on the tongue to 12 on the blade, the distance being 18 8-12 inches. Now lay the square on the board, using 18 8-12 inches on the blade and 17 inches on the tongue, marking on the blade side. This gives the bevel desired, or 12 and 11 will be perhaps more convenient figures to use.

This system works with any pitch of roof, and is the most simple and practical of any with which I am familiar. My experience has demonstrated that there are more carpenters who "fall down" on roofe cutting than in connection with any other work.

Measurements on Architects Plans.

From Hee H. See, *Brockville, Canada.*—Replying to the question of "C. C. H.," relative to measurements on plans, I would say that eight times out of ten the architect himself does not know. The best way for the carpenter to do is to measure up the full inside width or length of a house, deduct the thicknesses of the partitions and plastering on the side walls and then divide up the remainder as near as possible to given sizes.

PROBLEM IN GEOMETRICAL HANDRAILING.

By Morris Williams.

In the issue of the paper for June of last year there appeared an inquiry from "J. M. D.," Lansing, Mich., asking for the treatment of two geometrical stairways, one known to the trade as a quarter space stairway, with a quadrant connecting the two flights, which are placed at right angles to one another, and the other having a semicylinder of 12 inches diameter and containing eight winders, fixed between two flights, which are parallel one to the other. Nothing is said about the dimensions of the treads and risers, nor in reference to the arrangement of the risers adjoining the cylinders in either case.

It would appear from the sketch presented by the correspondent that the two adjoining risers to the quadrant are placed at the springing, namely, 7 inches from the corner in the direction of each flight. Whether "J. M. D.'s" requirement is a solution of a problem with risers placed as shown in his sketch it is difficult to determine from the wording of his query. However, we may here state that such an arrangement entails a great deal of extra labor in the development of the molds, finding the bevels and in the squaring and molding of the wreath. Adding to this the unsightly appearance of the finished rail that such an arrangement would produce, it is evident that under no consideration should it be determined upon.

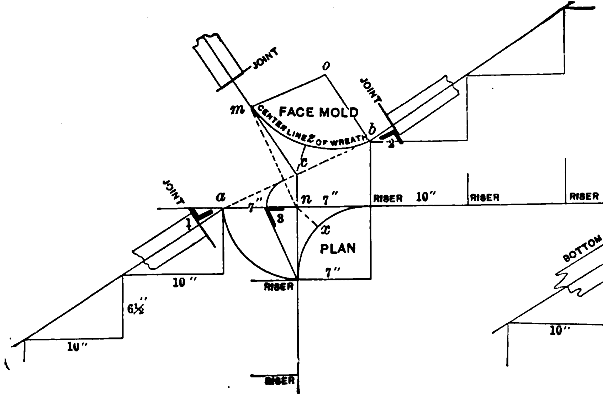


Fig. 1.—Plan, Elevation and Development of Tangents for a Quarter Turn Placed Between Two Flights.—Diagram Illustrating the Ramping of the Wreath.

In the endeavor to make clear a solution of the problem I have drawn in Fig. 1 of the accompanying diagrams the plan of such a construction. The elevation and pitch line of the tangents, as shown in this diagram, verify the above remarks. At *a b* is shown the pitch of the two tangents over and above a quadrant. It is shown to be less inclined than the pitch of the two flight rails adjoining and consequently necessitates the ramping of the wreath, which means an enormous amount of extra labor. This kind of a wreath also calls for extra thicknesses of plank and two additional bevels, as indicated at 1 and 2 of the diagram.

The center line of the wreath is shown developed as follows: From *n* draw a line square to the pitch line of the tangents *a c b*; make *c m* equal to *c a*; draw *m o* parallel to *c b*; make *c z* equal to *x n* of the plan. Take a flexible slat which will readily bend to touch the points *m z b* and sweep the curve of the center line of the wreath.

The bevel 3 is to square the wreath and is to be applied to both ends, while the two extra bevels 1 and 2 are to be applied to the sides after the wreath is squared, in order to produce a square butt joint with the adjoining rails of the flights.

In Fig. 2 is shown the correct method of treatment for this kind of a stairway, where it is shown that the two risers nearest the corner *c* are placed at a distance from *c* equal to one-half the width of the treads of the adjoining flights. The treads are 10 inches wide; therefore the first riser from *c* in the upper flight will be placed 5 inches from *c*, and similarly the first riser from *c* in the bottom flight will be placed 5 inches from *c*. The elevation of treads and risers and the development of the tangents in this diagram will produce a uniform pitch over the flights and quadrant, as shown by the line 1 2 3 4 5 6, which rests on the nosing of the steps.

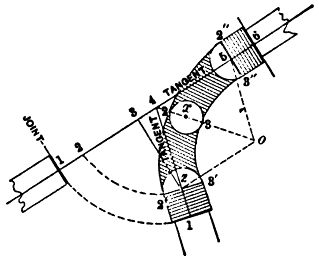


Fig. 3.—Diagram Showing How to Draw the Face Mold for the Wreath Over the Quadrant in Fig. 2.

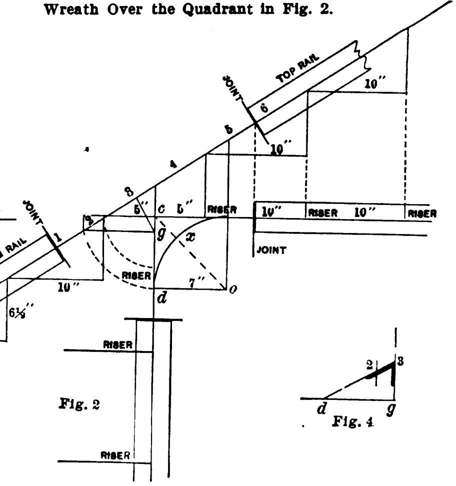


Fig. 2.—Diagram Illustrating the Correct Method to Manage a Quarter Turn Between Two Flights by Placing the Risers in Such a Way as to Obtain an Equal Pitch Over the Flights and Tangents.

Fig. 4.—Diagram Showing the Bevel to Square the Wreath Over the Quadrant in Fig. 2.

Problem in Geometrical Handrailing.—By Morris Williams.

This result simplifies the wreath construction considerably.

Fig. 3 represents the face mold and is developed as follows: Draw a straight line; transfer from Fig. 2 upon it points 1 2 3 4, &c.; from point 3 draw the line 3 *z*; make *z* 4 equal the length of 4 2 of Fig. 2, which represents the bottom tangent; draw *z o* parallel to 3 5 and 5 *o* parallel to 3 *z*; make 4 *x* equal to *c x* of Fig. 2.

We have in this manner found three points which are contained in the curve of the center line of the wreath or the face mold—namely, *z x* 5, and now we will find the width of the mold at each point. At *x* the circle represents the width of the straight rail of the flights, *x* being a point on the minor axis where the wreath in all cases is equal in width to the width of the straight rail. The width at *z* and 5 is taken from the bevel in Fig. 4. Make *z* 2 and *z* 3 each equal to 2 3 of Fig. 4; also make 5 2 and 5 3 each equal to 2 3 of Fig. 4. The outside and inside curve of the mold may now be described by bending a lath to touch the points 2′ 2 2″ for the outside curve and the points 3′ 3 3″ for the inside curve. To complete the mold we must add the shanks *z* 1 and 5 6, respectively, both additions being drawn in

alignment with the connecting tangents. The mold is now ready to be applied to the plank and the wreath material is to be cut out square to the face of the plank; then the bevel shown in Fig. 4 is to be applied to each end to square the wreath.

The bevel in Fig. 4 is found as follows: Make d g equal to o d, the radius of the plan quadrant in Fig. 2, and g 3 equal the line g 3 of Fig. 2; connect 3 with d in Fig. 4 and the bevel will be found at 3, as shown.

In Fig. 5 is represented the plan of the 12-inch cylinder with a few of the adjacent steps; also the development of the tangents for one section of the wreath, as for example, that from b to e. The adjacent steps are shown reduced, so that the portion of the rail connecting with the wreaths may be gracefully curved to form a ramp between the center line of the straight rail and the pitch line of the developed tangents prolonged from a to k, where the intersection occurs; and also to secure equal length for the balusters.

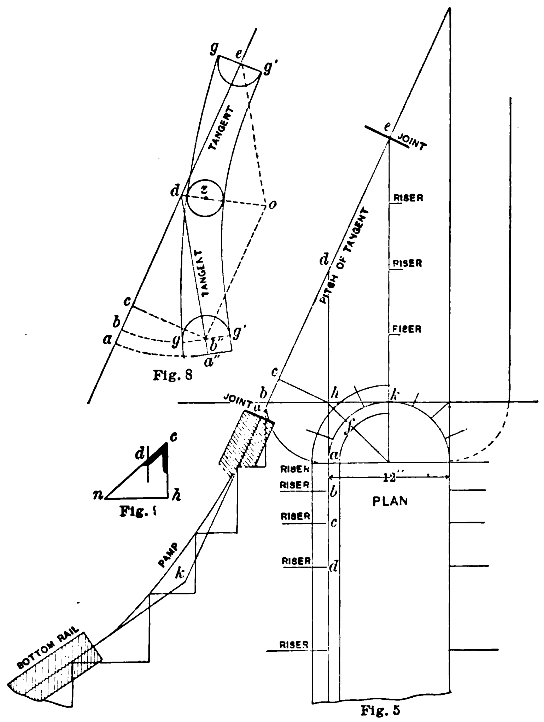


Fig. 5.—Plan of Stairway Having a 12-Inch Cylinder Between Two Flights, the Cylinder Containing Eight Winders.—Showing the Method of Unfolding the Tangents and Obtaining the Pitch Over the Cylinder.

Fig. 8.—The Face Mold for the Wreath Over the Cylinder Shown in Fig. 5.

Fig. 9.—Bevel for the Wreath Shown in Fig. 8.

Problem in Geometrical Handrailing.—By Morris Williams.

A very simple method is shown in Fig. 6 for reducing steps adjacent to cylinders. Draw the line a b and from o as center describe the center line of the wreath with a 6-inch radius; make n b equal to the stretch out of the quadrant n w. Upon b erect the line b 8 equal in length to eight risers; at a place the pitch board as shown, and continue its pitch to 3. Now bisect a 3 in k and draw a line from 8 to k, and the curve from m to a. The curve may be described by intersecting lines, as shown in Fig. 7, or by drawing a line at right angles to a k from a and another at right angles to the line m 8 from m. Where these lines intersect will be a center that may be used to describe the curve from a to m. In Fig. 6 draw level lines from 1 2 3 4, &c., to intersect the curve and the straight line from m to 8. From each intersection drop a line to the line a b, and on it will be found the dimensions of the reduced steps adjacent to the cylinder, as at d e f, &c.

We will now return to Fig. 5 and place the distance d e f as shown along the plan line of the stringer and draw the elevation as follows: The height from k to e is made equal to the height of four risers; that is one-half the number contained in the cylinder. The side plan tangent, h a, is revolved to b. Then the line b d e is drawn, which represents the pitch line of the two tangents b d and d e, respectively. From h is drawn the line h c square to the pitch line of the tangents.

The face mold may now be drawn, as indicated in Fig. 8. Draw a straight line from the pitch line of the tangents in Fig. 5; transfer the points a, b, c, d, e. From point c drop the line c b''. Place one leg of the compasses in d, extend the other to b and turn over to b''; connect b'' with d. Draw b'' o parallel to c d, and e o parallel to e d; then connect d with o; make d z equal to h z in Fig. 5, and on z, as center, draw a circle having a radius equal to one-half the width of the plan rail. Now on each side of b'', as b'' g and b'' g', place the distance c d taken from the bevel in Fig. 9, and the same on each side of e, as shown at e g and e g'. Now bend a lath to touch the points g and g; also the circumference of the circle, as shown, for the outside of the mold and the points g' and g' for the inside curve of the mold. The joint at e is made square to the tangent d b''. The distance from b'' to a indicates a piece of straight rail added to the mold so as to have the joint that much outside the cylinder, as shown in Fig. 5 from b'' to a.

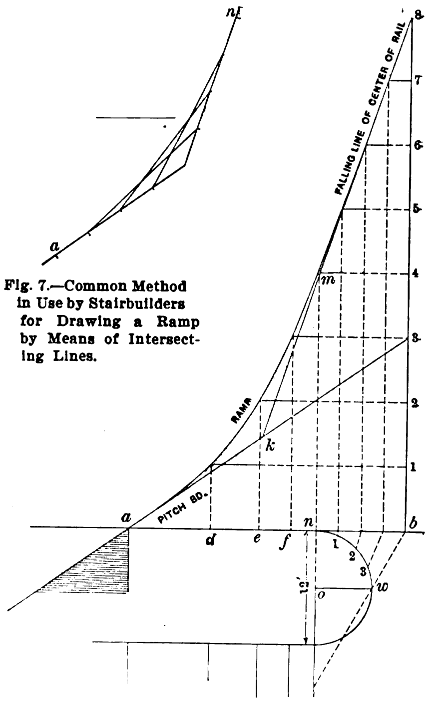


Fig. 7.—Common Method in Use by Stairbuilders for Drawing a Ramp by Means of Intersecting Lines.

Fig. 6.—Diagram Showing How to Reduce Steps Adjoining a Cylinder so as to Secure a Pleasing Appearance to the Finished Rail.

The bevel shown in Fig. 9 is found as follows: Make n h equal the radius of the cylinder and h c equal h c in Fig. 5; connect c with n. The bevel is shown at c and is to be applied to each end of the mold—at the end b'' in the direction of the inside and at the end e in the direction of the outside, all as clearly indicated in Fig. 10, where a view of the wreath after it is squared is given. In this figure it is also shown that the center of the wreath coincides with the center of the plank, a condition that must be kept in mind when squaring the wreath.

Where the tangents, as in this example, are equally inclined, the minor axis, as here shown, will be in the

center of the wreath and at this point an equal amount of waste wood will be taken from the top and bottom of the plank. The bevels at each end will indicate the waste wood to be taken off from each end and toward the minor axis.

In Fig. 11 is shown a method for finding the thickness of plank required for the wreath. The bevel at *c* is the one shown in Fig. 9. A square section of the rail is drawn; one side parallel with the blade of the bevel. The distance from *a* to *b* indicates the thickness of the plank. In Fig. 12 is shown the plan and elevation of the cylinder and a number of the reduced steps adjacent to it on both sides, also the face molds and bevels. In Fig. 13 we show a plan of the drum, and in Fig. 14 the elevation. Around this drum the stringer for the cylinder is bent, as indicated. There are various methods in use for bending these stringers, the one exhibited here being simple and easily executed. A piece of board, as shown in Fig. 15, is prepared by taking off its back a sufficient amount of material to leave a thin veneer, which will bend around the drum. The veneer is shown shaded in Fig. 13. Blocks known as keys are glued upon it and carefully jointed to one another, until the entire space shown from *a* to *b* in Fig. 13 is tightly filled. A few of these keys are made as indicated at *a* in Fig. 14 to extend a certain distance upon the drum, so that a nail or screw may be used to fasten the stringer to the drum until the glue is set.

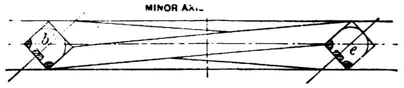


Fig. 10.—View of the Wreath After It Is Squared, Showing How It Is Done by Applying the Bevels to the Ends; in This Case Reversely.

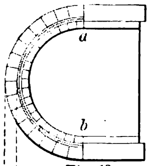


Fig. 13

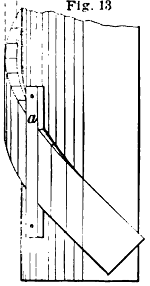


Fig. 14

Fig. 15

Figs. 13 and 14.—Plan and Elevation of the Drum to Bend the Stringer Around the Cylinder.

Fig. 15.—Showing the Veneer Prepared for Bending as Shown Around the Drum in Fig. 13.

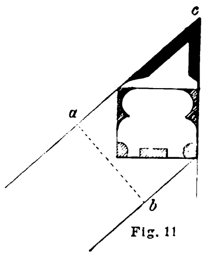


Fig. 11

Fig. 11.—Diagram Illustrating a Method to Ascertain the Thickness of Plank Required for a Wreath.

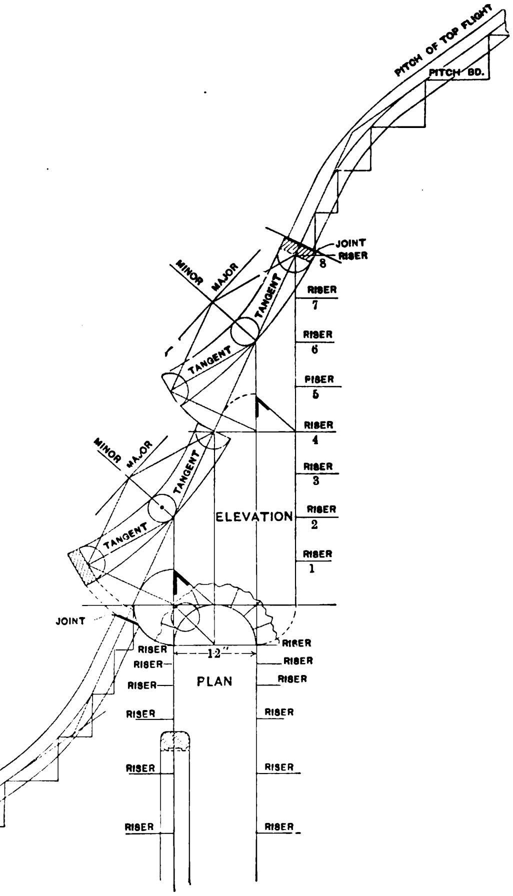


Fig. 12.—Diagram Illustrating the Complete Development of the Cylinder; Steps Adjoining; Tangents; Face Molds, and Bevels.

Problem in Geometrical Handrailing.—By Morris Williams.

◆

California's Largest Reinforced Building.

What is said to be the largest building constructed in the State of California of reinforced concrete is the Auditorium, now nearing completion at Los Angeles. It covers an area 165 x 175 feet, and in its central section for office purposes on Fifth street is nine stories in hight, while the wings, as they may be called, are six stories in hight. The main entrance to the Auditorium, which is in the rear, is through the middle of the Fifth street façade and is 42 feet in width.

The building is of reinforced concrete from top to bottom, and is in many ways a most interesting example of this type of construction. The roof, of reinforced concrete, over the auditorium is carried on trusses of the same material, have a clear span of 110 feet, the trusses being placed 10 feet apart. An enormous balcony is carried on cantilevers of reinforced concrete, thus doing away with columns on the floor below to obstruct the view from those occupying seats under the balcony. The main auditorium covers, with its stage, an area of 165 x 110 feet, and while its normal seating capacity is 3500, provision is made for seating 5000 should occasion require.

The great size of the room made the problem of proper acoustics an interesting one, and as the farthest seats are much beyond the ordinary range of the human voice, the sound waves are assisted by the air currents of the ventilating system. The air is blown in around and over the proscenium arch and exhausted around the side and rear walls of the auditorium and through the floor. The ventilating system is arranged to reverse in case of fire so that the smoke will be exhausted at the ceiling and the fresh air driven in at the floor and near the exits. The architect of this building is Charles F. Whittlesey, and John B. Leonard was consulting engineer.

◆

As soon as the work of demolishing the old buildings at the corner of Fifth avenue and Thirty-second street, Borough of Manhattan, New York, is completed a new 11-story structure will be erected, occupying a site 29 x 150 feet in plan. The store, basement and two floors above will be occupied by Brentano, who will take possession about the first of February, 1907.

CENTERS FOR ARCHES OF DOUBLE CURVATURE.*—V.

By Charles H. Fox.

FROM the explanations which have already been given the student who has closely followed the subject will understand the manner of generating the three surfaces forming soffits of cylindro cylindric, the cylindro conic and radiant arches. The intersection of the surface of the soffit with that of the cylindrical surface of the outer and inner faces, as shown in the points A, 2, 3, &c., of Figs. 11, 12 and 13, generates a curve. This is of double curvature, and it is necessary that this curve be developed upon a plane in order to obtain the direction for developing one of the sets of molds that are required for the purpose of giving the proper direction for forming the rib or sash. Although the surfaces of the soffit have each a distinct manner of generation, yet in the development of this curve of double curvature one general principle may be employed in the solution of each problem.

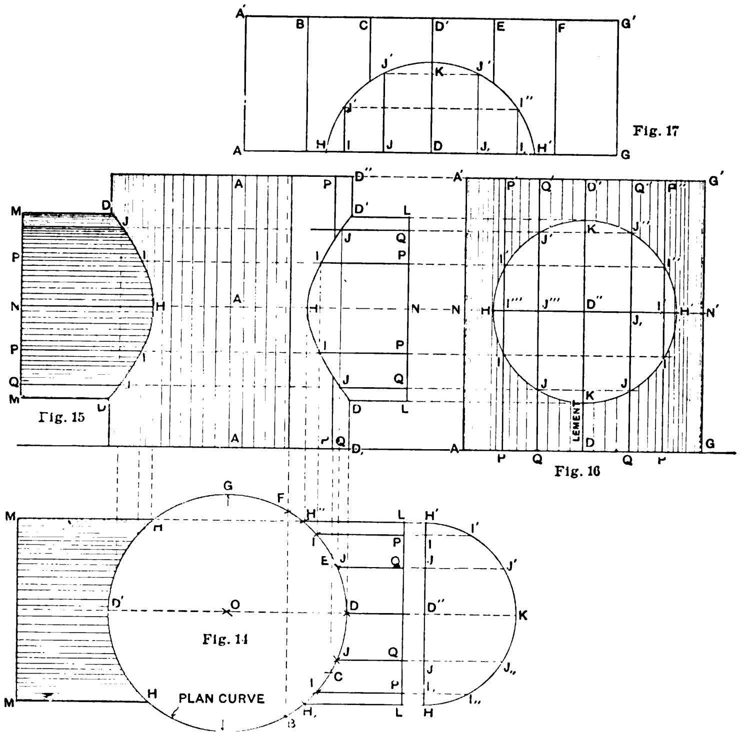


Fig. 14.—Shows Horizontal Projection of the Intersection of Two Cylinders.

Figs. 15 and 16.—Show Vertical Projection of Intersection.

Fig. 17.—Diagram Showing Development of Curve of Intersection on a Plane.

Centers for Arches of Double Curvature.—V.

This general principle will be explained in the construction of the diagrams Figs. 14 to 17, inclusive. In the first place, to develop a curved surface upon a plane means to unfold it on a plane so as to cover a plane area equal to that of the surface. It appears at once that the essential conditions which render this development possible are that the consecutive elements shall be in the same plane, otherwise their true relative position would be distorted by endeavoring to make them lie in the same plane, so that in the development of a curve of double curvature formed at the intersection of the conoidal with that of the cylindrical surface of the radiant arch it will be apparent that the surface chosen to be developed upon a plane must be that of the cylindrical surface which belongs to the face, which is one of single curvature.

In the development of any curved surface it becomes necessary to ascertain the length of a right line which will be equal in length to that of the circular base. Now the projection of a curve on either plane of projection is the base of a cylindrical surface passing through the curve and perpendicular to the plane on which the projection is made. This cylinder is called the projecting cylinder of the curve, and the finding of the right line just noted is called the rectification of the curve.

In rectifying a curve we cannot of course take the exact lengths of the small arcs, but must use their chords instead. The smaller the arcs are taken the nearer will the chords coincide with them, and consequently the nearer will the right line, which is the sum of these small chords, be equal to the length of the curve which it is taken to represent. To develop the surface of the cylinder represented in A D' G D and A A' G' G of Figs. 14 and 16. Suppose the surface of the cylinder to be placed on the plane of the paper, so that the element represented in D D' of Fig. 16 shall have the position given in D D' of Fig. 17, the plane of the paper will then be tangent to the cylinder along this element. Now suppose the cylinder to be divided into two equal parts, and let one-half of the cylinder be rolled toward G G', the other half to be rolled toward A A', the base of the cylinder being perpendicular to the element D D', its circumference will be developed into the right line A G. Understanding this principle, in Fig. 17, draw any line as that shown in A' G', then having in Fig. 14 divided the plan of the cylinder, which is of course the base, into any number of equal parts, as shown in the points A B C, &c., set off at the line A' G' of Fig. 17 the lengths A B C, &c., equal to those given in the corresponding projections of Fig. 14 and we may obtain the length of a right line which will be equal in length to that of the circular base of the cylinder. This is the simple principle which governs the development of all single curved surfaces.

Now to obtain the development of the curve of double

---

* Copyright, 1906, by Charles H. Fox.

curvature we take the problem involving the development of the curve of intersection of two right cylinders whose axes are at right angles to each other, one of them being vertical, the other parallel, to the ground line. This is really the problem given in the cylindro cylindric arch. In order to obtain the development required it becomes necessary to first construct the points of intersection of the two cylinders. The general method of determining the lines in which surfaces intersect is to intersect them by auxiliary planes, as those represented in the projections P I, Q J, D D', &c., of the diagrams Figs. 14, 15 and 16. These planes intersect the surface in such a way that each plane cuts rectilinear elements from both surfaces—that is, from the surface of the larger and from the surface of the smaller cylinder. The points in which the elements cut from one surface intersect those cut from the other surface by the same plane will be points common to the surfaces of both, and hence will be the points of their intersection.

In the construction of the diagrams we will show the practical application of the above mentioned principles. In Fig. 14, with center O, draw the plan of the larger cylinder. Divide the curve, as shown in the points A B C, &c., into any number of equal parts. Now through the center O produce a line, as D' O D'', and with any point, as that shown in D'' as center, with any desired radius, draw the curve H K H' of the small cylinder. Divide this into any number of equal parts, as shown in the points H I,, J,,, &c. Then parallel with D' D'', from each point produce lines, as shown, which meet the base of the larger cylinder in the points H, I J, &c. These are the horizontal projections of the points in which the auxiliary vertical planes intersect the surface of the cylinders. To obtain the vertical projection it is better to construct the curve of the smaller cylinder upon a vertical plane, as that shown in Fig. 16. In this diagram the radius of the curve, the length of the divisions, &c., are equal to those of the corresponding projections of Fig. 14. The length A G of the base of course is made equal to the diameter D' O D of the large cylinder. Now parallel with the line A G, from the points given in H I J, &c., of Fig. 16, produce lines indefinitely. Then square with the line A G, from the points H, I J, &c., of the plan, Fig. 14, produce lines. These, as shown in the diagram of Fig. 15, intersect the lines drawn from the corresponding points of Fig. 16, in the points D J I, &c. These are the points required of the intersection of the two surfaces, and a curve traced through them will be that of the curve of double curvature.

Now in Fig. 16, parallel with the base A G, through the point D'', produce a line, as N N'. This is the vertical projection of an auxiliary horizontal plane. This, as shown, intersects the vertical planes, &c., in the points I I''', J J''', &c. This understood, in Fig. 17 set off D J, J I, &c., equal to the length of the arcs of D J, J I, &c., of Fig. 14, then square with A G draw I I', J J', &c.; now make the lengths I I', J J', &c., equal to that of the corresponding lengths, as given in Fig. 16. The curve traced through the points thus obtained will be that of the development of the curve of intersection of the two cylinders. We have at this drawing shown only the one-half portion of the development. As will be obvious, the other half may easily be obtained in a manner similar to the above.

Upon a thorough comprehension of the principles involved in the solution of the problem just given will depend in a very great measure the ability of the student to accomplish the development of the falling molds, those that are required in order to give the proper direction for forming the contour of the surfaces which comprise the soffit and exterior bounding surfaces of the sash or frame, at their respective intersections with the cylindrical surfaces of the outer and inside faces.

WHAT BUILDERS ARE DOING.

A FEATURE of the building situation of Baltimore is the remarkable development of unimproved city and suburban property. This has been due in part to the great demand for dwelling houses, which even before the great fire had become scarce and rents had commenced to advance. The greatest activity has been in the north and northwestern sections of the city, where during the past six months over 400 dwellings have been put up at a cost of nearly $640,000. Of this number 322 were two-story dwellings, 19 were two and one-half story and 60 were three-story houses. In the northern suburbs a number of the dwellings are being constructed of concrete blocks, the machines for making the latter being so placed that the blocks are turned out only a short distance from the dwellings. The improvement of the suburbs is actively progressing, and this, taken in connection with the work which is being done in the business section, particularly in what is known as the burnt district, makes an aggregate of very fair proportions. The conditions are such that the feeling is quite general that activity in the building line will continue throughout the year and reach a volume in excess of that for the year just closed.

The Committee on Permanent Exhibition of the Builders' Exchange recently held a meeting and decided to have the formal opening of this department on June 11, 12 and 13. It is thought that everything will be in shape by that time and it is expected that the displays will attract a great deal of attention.

The annual outing of the members of the Builders' Exchange occurred on Easter Monday, the place selected this year being Middle River. Upon arriving at the grounds refreshments were served, after which amusements of various kinds were provided, including a baseball game, quoit pitching and selections by the Builders' Exchange chorus. A Maryland supper was served at 4 o'clock. The committee having charge of the outing was composed of Harry L. Starr, chairman; H. S. Raner, Arthur W. West and Charles H. Hicks.

Buffalo, N. Y.

An interesting feature of the building situation in this city is the agreement entered into between the master masons and the Bricklayers' Union, whereby the bricklayers will receive 53 cents per hour up to July 1 and 55 cents thereafter. The contract which has been entered into runs until January 1, 1908, and prohibits sympathetic strikes and establishes a working agreement which is in the main very satisfactory to the contractors. A contract has also been made with the Stone Masons' Union, No. 36, on the same working agreement as above stated, the wage scale for stone masons to be 48 cents per hour until July 1 and 50 cents thereafter. A contract has also been entered into with the journeymen carpenters, by which their wages are advanced from 37½ cents per hour to 40 cents. This contract likewise prohibits sympathetic strikes and permits employers working men on an "open shop" basis. Some little time ago the horizon in labor circles was much clouded, but the contracts above referred to have cleared the air and at present everything points to a peaceful and profitable season in the building line.

Chicago, Ill.

Building operations have been resumed at Chicago in full as a result of a conference between representatives of the Iron League, the Building Contractors' Association and the National Erectors' Association, held Thursday afternoon, May 10, at which the peace faction succeeded in effecting a compromise basis of settlement. The men will be paid 60 cents an hour, as against 56¼ cents, the old scale. This is a concession of 2½ cents an hour from the 62½ cents demanded by the iron workers. Other phases of the peace pact are embodied in the old agreement of the union and employers, including the eight-hour day and overtime pay. This settlement relieves a most paralyzing situation, involving nearly all the building crafts in a sympathetic walkout, and building is again being pushed with renewed vigor.

For April the figures surpassed all preceding records for that month in the history of the city. The cost reached the abnormally high figure of $12,139,875, nearly doubling the previous record, which was that of last year, involving a cost of $6,790,150. The frontage was 28,267 feet, against 23,601 feet of frontage last year and 1105 as compared with 794 buildings in April, 1905, an increase in frontage of 4666 feet and in buildings of 311. This is the largest number of buildings for which permits were taken out in any corresponding month in the history of the city, with the exception of April, 1892, when permits were taken out for 1349 buildings, and April, 1894, when permits were granted for 1120 buildings. The frontage exceeds that of any corresponding month, the closest approach being in April, 1903, when the aggregate frontage was 27,866 feet. In the high building

cost the total was swelled by the permit for the new county building, the cost of which was given at $4,500,000. A number of other large buildings contributed to the big total, including an addition to the retail store of Carson, Pirie, Scott & Co., costing $850,000; new Mentor Building, $400,000, and addition to the Auditorium Annex, $750,000. Building continues at a tremendous rate in the erection of apartment and flat buildings, and, outside of the few large buildings going up, the great majority of the construction is in that class of structure. It is estimated that the cost of buildings in preliminary course of construction will fully approximate $15,000,000.

Cleveland, Ohio.

The month of May finds builders and contractors as busily engaged as any previous spring in the city's history. The first day of the month dawned without a single strike in the building trade, making a marked contrast to the opening of the same month last year, when eight or nine trades left work with demands upon the employers. The peaceful situation at present is largely attributed to the fact that so many of the trades are working under open shop conditions, the labor organizations not being able to control sufficient of the trades to stop the progress of operations. Many large building projects are now under way and will be rushed as rapidly as possible during the summer months. Among these may be mentioned the new Taylor Arcade Building, the walls of which are rapidly going up; the new Y. W. C. A. Building, for which the structural material is almost completed; the Cleveland Trust Building, foundations for which are now being put in, and the new Hippodrome Building, all of which are close to the business center of the city.

The members of the Builders' Exchange of Cleveland and their families are anticipating with much pleasure the annual summer outing of that body, plans already having been made for one of the most delightful trips ever taken for recreation and rest. The time of the outing this year will be the last week in June. The place of rendezvous will be the Thousand Islands of the St. Lawrence. The party will leave on one of the elegant palace steamers of the Cleveland & Buffalo line on the evening of Tuesday, June 26, the journey to be conducted by W. F. Herman, general passenger agent of that line, who has made all arrangements for the comfort and pleasure of the builders. It is expected that upwards of 200 persons will join in the outing. The party will arrive in Buffalo on Wednesday morning, June 27, and will have breakfast upon the boat, after which they will board a special train of vestibuled coaches on the New York Central Railroad, proceeding east via Rochester and Syracuse, stopping at the last named city for luncheon, the journey then taking the builders along the foothills of the Catskills to Clayton, where a chartered steamer will be in waiting to convey them to Alexandria Bay and the Thousand Island Hotel, where special accommodations have been reserved. In the evening there will be dancing and other entertainment at the hotel, and on the following morning a ramble will be taken by special boat, which will be placed at the disposal of the party for the day. In the afternoon there will be baseball and other forms of athletic sport and in the evening a searchlight trip among the islands. The beautiful summer homes of wealthy people who reside in this locality will provide plenty of interest for the builders, and there are some who expect to catch as large fish as were ever taken from the waters thereabouts. The start for home will be made on Friday morning at 10 o'clock, the return trip being by the same route as the going trip, the party arriving in Cleveland Saturday morning in time for closing up the business of the week and the month. In previous years the exchange has visited on its annual jaunts Niagara Falls, Toronto, Muskoka Lakes, St. Clair Flats, Detroit, London, Ont.; Chautauqua Lake, Put-in-Bay, and Cambridge Springs.

At the recent quarterly meeting of the Builders' Exchange a request from the Merchant Marine League that the exchange adopt a resolution favoring the Gallinger Ship Subsidy bill was considered. The exchange had as guests at the meeting Harvey D. Coulder, Esq., president of the league; F. F. Prentiss, president of the Chamber of Commerce, and several other gentlemen prominent in the support of the bill throughout the country. After a full explanation of the measure the exchange adopted a resolution placing it on record as favorable to the enactment of legislation now before Congress. The meeting was very interesting, being characterized by a number of reports from the various committees of the exchange, indicating its activities. The report of attendance at the exchange indicated the daily average for April to be 251 members and visitors. A report was made by the special Building Code Committee recommending that a new schedule of fees for the operating of the building inspector's office be adopted in order to make that office self sustaining and insure its continued efficiency. Following the business session refreshments were served by their caterer and a social hour was enjoyed.

The Cleveland Exchange assisted in the collection of the fund for the relief of San Francisco sufferers and sent a letter to the builders' organization in that city offering help in all possible ways. A letter has been received in reply saying that within a fortnight after the fire a temporary building had been erected for the exchange in the coast city and that a site had been purchased for a permanent building, which will be constructed as rapidly as possible.

A resolution was recently adopted by the exchange commending Congressman Burton for his stand at Washington in favor of protecting the falls at Niagara. Mr. Burton has introduced legislation to restrict the amount of water that may be taken from the river above the falls. His determination to keep the falls as a great national attraction is commended by architects and artists as well as builders throughout the country surrounding the great cataract.

A visit from John S. Stevens, president of the National Association of Builders, was very greatly enjoyed by members of the Cleveland Exchange early in May. Mr. Stevens made a speech at the "change hour" and shook hands with his old friends in his usual affable manner.

Lowell, Mass.

The amount of present and prospective building in Lowell compares very favorably with past years and is of a nature which speaks well for the future of the city. A number of operations are under way, among which may be mentioned the new Chalfoux Block, the foundations for which are practically completed. With the exception of the concrete floor work the principal contracts were secured by Lowell concerns, and the building when finished will be one of the finest in the city. Work is about being started on the new St. Louis school, which is to cost in the neighborhood of $70,000. The Richardson Hotel, recently damaged by fire, is to be enlarged and equipped with modern conveniences and will have added about 30 bathrooms. The new factory of the Mawhinney Shoe Company is being fitted with machinery and the work of manufacturing will be soon commenced. The opening of this factory will bring a large number of operatives who must be housed, and as a consequence of this prospective movement values of real estate in the vicinity have already advanced. The corporations are running full time and one or two are about erecting some minor buildings, such as storehouses, &c.

The annual meeting of the Builders' Exchange was held on the afternoon of Wednesday, April 18, at which the following officers were elected for the ensuing year: President, Charles F. Varnum; vice-president, Cyrus Barton, and secretary, Herbert R. White.

The directors selected for the ensuing year were C. M. Forest, E. A. Wilson, G. H. Staples, F. L. Weaver, L. A. Derby and G. H. Watson.

In the evening the eighteenth annual banquet was held at the New American House, the gathering being highly representative of the leading contractors of the city. A reception was held just prior to the banquet, and at 6.30 Frank L. Weaver, chairman of the Entertainment Committee, with President C. F. Varnum, led the way to the banquet hall, where a substantial menu had been prepared for the members and guests. When the good things provided had been duly considered President Varnum introduced Frank L. Weaver as toastmaster and spoke briefly of the early history of the Builders' Exchange. President A. G. Walsh of the Board of Trade referred to the influences which tend to improve the grandeur of a city and make it greater and better, in the accomplishment of which the master builders play an important part. He appealed to his hearers to cultivate the spirit which tends to make progress in spite of any obstacles that may be encountered, and to show to all who might seek habitation in the city that there is a chance for every one. A few remarks were also made by Secretary J. A. McKenna of the Board of Trade.

The address of the evening was delivered by Edward S. Larned, one of the leading cement experts of the country, who entertained the members with a talk which was closely followed by every one present and which was of great benefit to all interested in the use of cement in connection with building construction.

New York City.

One of the things likely to attract the attention of the casual observer strolling about the city streets is the number of substantial buildings which are being torn down to make room for the onward march of improvement. Not alone are old office buildings being razed to provide sites for modern structures, but private dwellings, club houses and even churches are being demolished for this purpose. This condition of affairs is not confined to any one particular section of the city, but workmen are busy at various points in both the business portion of the metropolis as well as in the residential districts. In this respect Fifth avenue below Forty-seventh street, and particularly in the neighborhood of Thirty-fourth street, is rapidly being transformed into a busy business section.

Outside of a few slight differences existing between employers and workmen in some of the branches of the building industry comparative peace reigns in the labor world, and building operations are being conducted upon a scale which compares most favorably with a year ago. The estimated cost for the building improvements for which permits were issued in the Borough of Manhattan since the first of the year aggregates a trifle over $52,000,000, as against $39,750,000 last year, and in the Borough of the Bronx the value of

the improvements is $11,000,000, as compared with $12,500,000 in the same time a year ago. These figures relate strictly to new buildings, and do not include $8,800,000 in the two boroughs for alterations and repairs, as against $5,370,000 for the corresponding period in 1905. In the Borough of Brooklyn a slight falling off is noticeable, the figures being $17,300,000 since the first of the current year, as compared with $18,990,000 in the same time last year.

A striking feature of the building operations in the Borough of the Bronx this spring is the decrease in the amount of flat and apartment house construction and a corresponding increase in the number of plans filed for one and two family houses, ranging in cost from $3000 up to $8000.

Orange, N. J.

The first annual banquet of the Master Builders' Association of the Oranges occurred on the evening of April 16 in Jacoby's Hall, Newark, N. J., at which a large number of members and their friends were present and great enthusiasm prevailed. The banqueters were conveyed from their headquarters in Orange in special trolley cars, arriving at the scene of the feast a little before 9 o'clock. During the evening there was music by Jacoby's Orchestra, illustrated songs, in some of which the builders joined vigorously in the chorus, monologues, and clever tricks by various artists. The master of ceremonies was President F. M. Struck of the association, and among the guests were Alderman Davis of Orange and Dr. William M. O'Brien, Mayor of West Orange.

After the many good things provided on the menu had been duly considered and coffee was served, Toastmaster Struck spoke a few words of congratulation and welcome and then introduced Alderman Davis, whose toast was "The Oranges and Their Builders." What he had to say was much to the point and was followed with close attention on the part of those present. After the applause following his address had died out the toastmaster called upon the vice-president, John B. Everett, of the association, who indorsed the remarks of Mr. Davis as to the need of local tribunals of arbitration to settle points arising between capital and labor, and expressed the hope that the day would soon come when this would be accomplished. Mayor O'Brien of West Orange then made some timely remarks, after which Councilman Joseph Brown had something to say relative to the problem of transportation and the development of that section of the Oranges which he represented.

The Committee of Arrangements consisted of the following members, representing the several branches of the building trades: Carpenters, H. Carhart, chairman; F. M. Struck and Albert Menzel; masons, C. H. Shanger, R. L. Tobin and Harry Becker: plumbers, George H. Brenner, William F. Beck and A. E. Daum; painters, Maynes Potter, L. B. Sanders and Henry James.

Philadelphia, Pa.

Statistics indicate a further increase in the building of two-story dwellings during the month of April, while permits taken for three and four story dwellings for the same period indicate a decline in the erection of buildings of that class. There seems to be no let up in the demand for two-story houses, and operations covering work on dwellings of that type are increasing in size, one of particular note last month taking in 142 houses alone, at an estimated cost of practically $200,000.

The records of the Bureau of Building show that 981 permits covering 2268 operations were taken out during the month of April, the estimated cost of which aggregated $4,071,885, this showing a decrease in value from the previous month of a little over $1,000,000. The value of the permits taken for two-story dwellings for the corresponding period showed slight gain in favor of the month of April, but those for three and four story dwellings show a decline in value amounting to over $500,000. At the same time there was a falling off of nearly $600,000 in the amount of new work taken along the lines of manufacturing buildings, churches and apartment houses. This, however, is not looked upon as any means of measuring the activity of the building trades. Home building has for years been the feature of interest in the local building circles, and along this line there is at the present time no indication of any retrogressive movement.

Every branch of the trade is busy, operation work is progressing rapidly and favorably, and ground has been broken during the past month for an enormous amount of work. Building materials are in many instances hard to obtain promptly and frequent delays in the completion of work are heard of on this account. Taken all in all, the year promises to be an unprecedented one. The volume of work already under way shows a large gain over the corresponding period last year, when 1001 permits were issued, covering 2034 operations and estimated to cost $3,310,740.

While there was some agitation, as is the usual custom during the latter part of April, regarding the status of labor, employers and employees settled their differences amicably in almost every instance where demands were made. The master carpenters advanced wages from 40 to 45 cents per hour, regardless of whether or not the employee was a member of the Associated Carpenters or the Allied Building Trades Council, which is virtually an open shop agreement. The Tile Layers and Helpers' Union, which demanded an increase of 10 cents a day, agreed to certain working modifications and retained the old wage rate. The plasterers demanded an increase in wages, but remain at work pending conferences with their employers. The bricklayers have signed a year's contract at $5 per day of eight hours, while the elevator constructors, who demanded $4.25 per day, accepted $4 per eight-hour day. All in all, the labor situation, in view of the prosperous condition of business, is generally considered to be in quite a satisfactory condition.

Among some of the prominent building operations was one by Joseph F. Bradley, who will erect 94 two-story dwellings in West Philadelphia, in the vicinity of Sixtieth and Vine streets. The majority of these will measure 15 x 36 feet 9 inches, and the cost is estimated to aggregate $131,600.

Wm. G. Price, Jr., has begun work on an operation including 77 two-story houses, 15 x 38 feet, each in the southwestern section of the city. This operation is expected to cost $154,400.

Erick A. Anderson has taken a permit to erect 142 two-story brick dwellings and three two-story stores in the vicinity of Twelfth and Porter streets. The following sizes will prevail: 14 x 36 feet, 16 x 47 feet and 16 x 38 feet. The cost of the operation is estimated at $183,800.

Pittsburgh, Pa.

The season has opened with a rush, and permits for building improvements during the month of April, as shown by the report of Superintendent S. A. Dies of the Bureau of Building Inspection, are far ahead of the corresponding month of last year. The work under way is greatly diversified, and dwelling houses constitute an important factor. During April there was a total of 471 permits issued by the bureau for building improvements aggregating an estimated cost of $3,909,103, as compared with a total value for April of last year of $2,192,193.

Reports to the contrary notwithstanding, the new building of the First National Bank, which is to be erected at Fifth avenue and Wood street, is to be only one story in hight and will cover an area 80 x 120 feet, the former being the Fifth avenue frontage. It will not only be the largest one-story banking house in the city, but will also be the finest as regards finish and convenience of arrangement.

Rochester, N. Y.

The figures compiled in the fire marshal's office for the month of April show something of a lull in the volume of building operations as compared with the corresponding period in the past two years. The value of the improvements for which permits were issued is placed at $657,196, as against $957,412 in April of last year and as compared with $901,983 in March of the current year. Taking the four months of 1906, the figures show building improvements estimated to cost $1,944,491, while in the same months of last year the improvements were valued at $1,850,964.

Washington, D. C.

Building operations in the city of Washington, D. C., show a slight falling off in April as compared with the same month a year ago, when the value of the building improvements reached a total of about $1,750,000. In April of the current year 504 permits were issued for buildings estimated to cost $1,582,600, and among the improvements were three churches, three warehouses, one bank, about 100 brick dwellings and an apartment house which is to cost nearly $500,000. Just at present there seems to be an unusual demand for property in the southwestern section of the city, and the statement is made that it is difficult to find for rent a good house with modern improvements. Values are reported steady in this section, and its accessibility to principal centers makes it desirable for residence purposes.

Notes.

The strike of the carpenters in Taunton, Mass., has been settled, the master builders granting a minimum wage of $2.80 per day for journeymen carpenters and $3 a day for first-class men.

An agreement has been reached between the Master Builders' Association and the bricklayers, plasterers and stone masons of Trenton, N. J., whereby the plasterers and bricklayers, who have been receiving 50 cents an hour, will be given an advance of 10 cents an hour, and the masons, who have been getting 48 cents an hour, will receive 50 cents.

Articles of incorporation were recently issued by the Secretary of State of Illinois to the Edwardsville Builders and Contractors' Association. Those prominent in the movement are Charles Grebel, Sr., Joseph Kesl and J. H. Stolte.

The annual banquet of the Builders' Exchange at Kalamazoo, Mich., was held on the evening of May 2 at the Elks Cafe, the dining room being decorated with carnations and roses, while from the chandelier in the center of the room hung a saw and a hammer tied with ribbon. Lou Larsen was toastmaster, and after the menu had been duly considered brief remarks were made by various members.

New Publications.

The Business of Contracting. By Ernest McCullough, member Western Society of Engineers; 45 pages. Size, 5¼ x 7½ inches. Bound in paper covers. Published by the Technical Book Agency. Price, 50 cents postpaid.

This little work, as its title indicates, bears upon the subject of contracting and will be found of special interest to a large class of readers. It has been prepared by one well qualified by reason of his practical experience to discuss the business of contracting in a way to appeal to those engaged in this particular line. The author points out that the secret in successful contracting lies in personal supervision, and by that he does not mean personal supervision by trained employees, but by "experienced, thinking employers." The business of contracting, he points out, contains so many elements of chance that success is obtained in proportion as the contractor's ability to personally oversee the work is assumed. In the first chapter the author shows the proper staff for a contracting business and briefly outlines the duties of the manager and the superintendent, after which he tells what kind of a man makes the best foreman, and describes what should be his qualities in order to insure success. In chapters three and four the question of bidding on work is taken up, after which the author describes "some working methods." Next in order is a chapter on "the office on the work," and then "field and office methods."

Architectural Hard Wood Finishing. By George Whigelt; 124 pages. Size, 4¼ x 7½ inches. Illustrated. Bound in board covers. Published by the *Painters' Magazine*. Price, $1, postpaid.

This little work consists of a series of 12 articles which appeared last year in the *Painters' Magazine*. They were written by a practical mechanic who has had more than 20 years' experience in all classes of hard wood finishing, and who has invented a number of valuable processes. The little work has been brought out as a valuable addition to the library of the practical painter, the architect, and in fact every one interested in architectural hard wood finishing.

The matter is comprised in 15 chapters, the first of which relates to the woods generally used for the trim and floors of buildings, which require a natural finish, such as oak, ash, walnut, mahogany, birch, cherry, maple, redwood, cypress, sycamore, pine, rosewood, whitewood and a number of others. The characteristics of each of these woods are briefly set forth, after which attention is given to sandpapering, scraping and preparing the wood for finishing. One chapter deals with stains and the staining of wood, another has to do with the preparation of stains, while others treat of wood fillers, paste fillers, first coaters, varnishing, rubbing and polishing, wax finishing, floor finishing and the finishing of fireproofed wood. The later chapters take up the subject of refinishing, piano finishing, and the best methods of using water stains.

The School House. Its Heating and Ventilation.—By Joseph A. Moore; 204 pages. Size, 6¼ x 9½ inches. Profusely illustrated. Bound in board covers with gilt side and back titles. Published by the author. Price, $2.00, postpaid.

The writer of this work has for the past 18 years been engaged in the inspection of public buildings in the State of Massachusetts, and in supervising the construction of and testing the various methods of heating and ventilation, especially in school houses, and presents to those who may be interested in our public schools some suggestions as to the construction and the heating and ventilation of such buildings. In his presentation of the subject he has refrained from giving theoretical or scientific descriptions or arguments, but rather such methods and plans as have been proven by actual experience to give satisfactory results. The work is divided into two parts, the first of which deals with the school house in all its various aspects. In succession he takes up the location, the size and cost of the building; the laws of Massachusetts bearing upon school house construction and sanitation; the amount of air required per pupil by the Massachusetts regulations; tests of the amount of air supply to heat in school rooms; the difference in cost of heating school houses; the size and construction of warm air ducts and flues, chimneys, &c. Two of the chapters deal with the question of steam heating and another takes up the subject of the use of furnaces in small buildings, with location, construction, size, &c.; also combination of furnace and steam heating, twin connected furnaces, combination of furnaces and hot water heating, fans for supplying air to furnace, electric motors, gas engines, &c. The method of setting up indirect radiators, as shown by the drawings, and now generally adopted in Massachusetts, was designed by the writer and first published in drawings which formed part of the official exhibit of the Inspection Department of the Massachusetts District Police at the Columbian Exposition in 1893. Other plans formed part of the exhibit at the Paris Exposition in 1900, and at the Louisiana Purchase Exposition in 1904. Another chapter deals with the duties of janitors and another has to do with sanitary appliances in school houses.

The second portion of the work is taken up with plans and descriptions of school houses, all presented in a way to be of the greatest interest and value to the architect and builder. The plans are given to a sufficiently large scale to clearly show the location of leading features in connection with the heating and ventilation of the buildings, while sectional views materially assist in this respect. The plans are of a varied character, ranging as they do from the one-story one-room school house to those of a much larger and more pretentious type.

Brayton Standards.—By Louis F. Brayton, consulting engineer; 110 pages. Size 4⅛ x 6⅜ inches. Illustrated. Bound in flexible covers. Published by the author. Price, $3, postpaid.

This little work is a pocket companion for the uniform design of reinforced concrete, the point being made that the strength of the various members required in the composition of a structure can be as safely calculated in reinforced concrete as they can be in wood or steel. The matter presented is a compilation of information acquired from actual experience coupled with the necessary theory. The methods of construction shown are not merely theoretical but have been put into practice, and according to the author have been found highly efficient and economical. A large number of tables, together with details of construction, are presented in such form as to be available for the use of all, and primarily to enable architects and engineers who have not made a specialty of this class of work to show the complete drawings required to properly illustrate a structure in reinforced concrete, so that all contractors bidding upon work will bid on a uniform basis and upon a design which is entirely satisfactory to all concerned. The author believes that reinforced concrete should be standardized and that standard methods should be adopted in such a form that the architect, engineer or contractor is made entirely independent of the so-called patented "systems," and at the same time the standards should be arranged so that where it is shown profitable a patented section could be substituted for the reinforcement shown upon the designer's plans. He sees no reason why there should not be standards for reinforced concrete the same as in connection with structural steel, where all designers adopt the standard sections rolled and specify uniform connections. While it is true that there are present great variety of so-called "systems," it is also true that perfect construction can and is every day being devised which is not using patented forms or methods.

The little work is of a nature to interest many of our readers and is issued at a time when, by reason of the rapidly growing use of concrete, it cannot fail to prove an acceptable addition to the architect's and builder's collection of trade literature.

The Architects and Builders' Directory of Detroit and Wayne County. By Frank Arthur Barrett; 150 pages. Size, 4½ x 6 inches. Bound in paper covers. Published by the author. Price, 55 cents postpaid.

This little work contains a great deal of interesting information for the architect and builder, giving as it

does the building ordinances of the city of Detroit, the names of the officials of the various departments, the names and addresses of the Builders and Traders' Exchange; also of the Builders' Association, together with the names and addresses alphabetically arranged of architects, builders and dealers in all kinds of builders' materials. Scattered through the work are advertising cards of concerns engaged in various branches of the building and allied industries.

◆

Fireproofed Steel Construction.

The following interesting comments on the above subject were presented by William Sooy Smith at the May meeting of the Western Society of Engineers in Chicago:

The ease and perfection with which all the parts of steel structures can be accurately proportioned to the strains to which they are to be subjected; the lightness, uniformity, tenacity and unequalled capacity to withstand shocks, vibration and strains varying in intensity and direction; the cheapness and durability when properly used and protected from corrosion and high temperatures, all point to steel as the material par excellence for the tall structures, that have come to stay. These advantages are rapidly becoming well known and recognized by engineers, architects and builders, and the extensive and growing use of steel for bridges and buildings is the legitimate result. With proper precautions in the use and protection of steel in the construction of a building it becomes the lightest, safest, cheapest and most durable edifice that can be built.

Whatever materials are employed in buildings, neglect of correct plans, faulty execution or want of proper protection and preservation is always dangerous and often fatal. There is no mystery in the precise methods to be used in securing first-class steel skeleton structures and protecting them perfectly from corrosion and the injurious effects of high temperatures.

It is now evident that in the countries subject to earthquakes, buildings should, if possible, be so planned and constructed that they will stand the strain produced by the vibrations and movements that occur in the varied materials on which the foundations rest. They also must be fireproofed to save them from destruction by the flames which rise at so many points and that may spread so widely as to bid defiance to all efforts to extinguish them, especially when the whole water supply of a city may be suddenly cut off. Now supposing the building has been planned and built in accordance with the requirements herein set forth, so far as its strength is concerned, but containing combustible materials in the frame structure or materials unprotected that may be so weakened by heat as to fail, the destruction of the building will surely ensue if an earthquake takes place such as that which has just occurred.

The essential characteristics of a fireproofing material for buildings are:

1. It must itself be incombustible.
2. It must be, as nearly as possible, a nonconductor of heat.
3. It must be strong and durable.
4. It must stand heating to redness and plunging into cold water without cracking.

A fireproofing material, possessing all the essential properties enumerated, has been discovered. If the steel skeleton is covered with metal lathing, strong wire cloth or expanded metal lathing, heavily plastered inside and covered with stucco on the outside, roof and all, using an asbestic or other equally good fireproofing material, mixed with quicklime on the inside and Portland cement on the outside, it will be safely protected from corrosion and heat and the stucco will be as hard and durable as stone. In case the plaster and stucco are shattered (which can hardly occur as they are strongly reinforced by the steel lathing) and knocked off by heavy strains or shocks, the steel frame will not be injured nor will life be destroyed by the fall of the small fragments. In the light of these facts it would seem to be very much out of place to load the steel structure with the enormous weight of a heavy and clumsy integument of brick, concrete or stone, which adds but little strength, only great weight, and thus making the building weaker instead of stronger, not safe but more dangerous, less impervious to heat or cold and far more costly, both in foundation and superstructure.

◆

An Unusual Roof and Wall Construction.

The roof covering of the electric light and power station of the Nassau Light & Power Company, at Glenwood, Long Island, is of galvanized corrugated iron laid on 4-inch channel purlins spaced 4 feet apart, with a similar lining underneath the purlins in order to form an air space and prevent a collection of moisture and condensation from the air, as would occur if an ordinary covering were used. This gives the advantage of a wooden roof, it is held, without the fire risk thereby incurred. There are monitors in the roof, fitted with pivoted sash operated by the Lovell window apparatus, manufactured by the G. Drouve Company, Bridgeport, Conn. The side wall construction consists of an inner lining of galvanized corrugated iron, on which is mounted expanded metal. This is fastened to the nailing strips applied to the corrugated iron, and on the expanded metal there is a 2-inch coat of cement mortar in which was imbedded before setting a facing of small pebbles.

◆

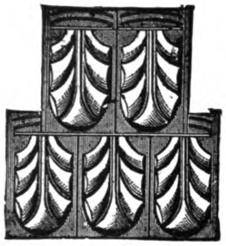
The Young Men's Christian Association of Wilmerding, Pa., is erecting a new building which it is expected to have ready for occupancy by the first of January the coming year. The first floor will contain a gymnasium, with running track overhead, an auditorium seating 600 persons, billiard room, lobby and offices of the secretaries and physical director. On the second floor will be the library and reading room, club room and a special room for boxing, wrestling and fencing. On the third floor will be class rooms, kitchen, dark rooms for camera clubs, &c. In the basement will be four bowling alleys, dressing rooms, 500 steel lockers, swimming pool, shower baths, rifle range, &c. The building, which was designed by Milligan & Miller of Wilkinsburg, will be located on a bluff overlooking the railroad and street car approaches.

CONTENTS.

Editorial—

Correspondence—

Novelties—



NEW CENTURY
PAINTED TIN
GALVANIZED
COPPER : : : :

PERFECTION ATTAINED
In our NEW CENTURY PATENT
METAL SHINGLE

Perfect Joints. A Sample will interest you.

Wanted, Agents in every town.

CELEBRATED "CAHILL" PLATED GRATES.

MANUFACTURED SOLELY BY

The Chattanooga Roofing & Foundry Co.,
CHATTANOOGA, TENN., U. S. A.

HICKS' BUILDERS' GUIDE

18th THOUSAND

A testimonial of the Guide, more expressive than any we could offer, is the sale, which is now in the eighteenth thousand. The book sells because it is wanted and is wanted because it is known to be one of the most practical convenient and useful of the handbooks for the young carpenter and builder. The Guide was designed by a man who understood their needs and the knotty problems of the daily work are solved in the simplest and best ways.

Especially full on the methods of framing and estimating the cost of labor and material

A GLANCE AT THE CONTENTS:

Points on Estimating.
A practical review of measures, items and quantities, with lists of material.

Geometrical Measurements of Roofs.
Explaining the accurate method of measuring various shaped roofs.—Illustrated.

Hip and Valley Roofs.
Another section on figuring roof area. Clearly explained and illustrated.

Estimating Labor for Carpentry Work.
The author's simple and reliable method of finding figures and quantities in this comparatively difficult phase of estimating—with lists of items and prices.

Short Cut in Estimating.
A short method of figuring the bulk of rough work, including framing, raising, sheeting siding, roofing, laying of floors, setting partitions, &c.

Practical Methods of Construction.
Bringing out a few points on carpentry which are often neglected or overlooked.—Illustrated.

Binding Sliding Doors.
A frequently needed remedy.—Illustrated.

Art of Roof Framing.
A very complete treatment extending from pages 87 to 150. Begins with the simplest form of roof and goes step by step through roof framing of all descriptions.—50 illustrations.

Mitering Planceers, Mouldings, Etc.
Illustrates and describes the making of joints, which many workmen find troublesome.

166 Pages. 114 Illustrations. One Dollar, Postpaid.

DAVID WILLIAMS COMPANY, Publishers,
14-16 PARK PLACE, NEW YORK.

The man who is interested in any branch of wood finishing should have

The Modern Wood Finisher

BY F. MAIRE.

Contains well-tested, reliable information on woods and their treatment-

A Book of 159 Pages.
Fifty Cents, Postpaid.

DAVID WILLIAMS COMPANY
14-16 Park Place, New York

Carpentry and Building
WITH WHICH IS INCORPORATED
The Builders' Exchange

PUBLISHED MONTHLY

To all parts United States, British America and Mexico. -	$1.00 Per Year
To all other Countries, - - - - - - - -	1.25 Per Year

Advertising Rates on Application.

BUSINESS OFFICES.

NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHERS........................14-16 Park Place.
PHILADELPHIA—S. S. RECKEFUS, Manager..Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—WALTER C. ENGLISH, Manager........................Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, Manager........................Park Building, 357 Fifth Avenue.
CHICAGO—A. A. AINSWORTH, Manager........................Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—HENRY SMITH, Manager........................Pickering Building, Fifth and Main Streets.
CLEVELAND—EZRA S. ADAMS, Manager........................The Cuyahoga, 311 Superior Street.

ENTERED AT THE POST OFFICE, NEW YORK, AS SECOND-CLASS MATTER.

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

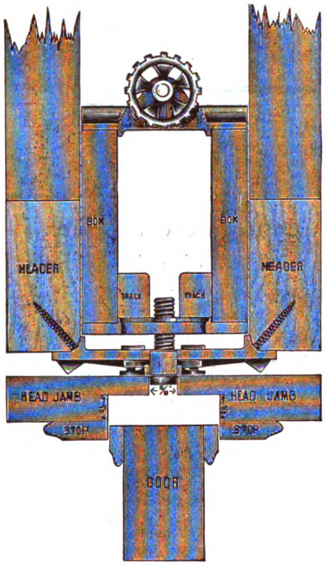
Digitized by Google

Original from
UNIVERSITY OF MICHIGAN

NOVELTIES.

Luitink's Adjustable Door Track and Hanger.

Luitink & Sons Mfg. Company, Milwaukee, Wis., is manufacturing the adjustable door track and hanger shown in end view in Fig. 1. Either single or double doors can be used with the track, as circumstances may require. Doors can be hung quickly, it is explained, as it requires but the driving of six screws for a single door, or ten screws for double doors. The box and track of selected material are shipped complete by the makers, and the track is inclosed in a manner to prevent dust or mortar settling upon it. The track can be put up before or after the plastering is done, which permits its use in old as well as new buildings. Planed face double wheels of large diameter are used, with a yoke running over the axle on an antifriction principle to enable even extra heavy doors to move freely and smoothly. The track is made of maple to obtain a soft, easy and noiseless sliding of the door. The adjustable feature is entirely in the track, the hanger being nonadjustable so as not to get out of order. The track simply rests on bolt heads, supported by brackets attached to the jamb studs on each side, and is not fastened at any point. There is a side swing or lateral motion in the hanger, so that the door will not bind, but will always carry plumb. Adjustments in the track, which are as follows, can be made with the use of a screw driver: The track can be raised or lowered; it can be raised or lowered sideways, so as to equalize any uneven settling in the partitions; adjustments of double doors can be made at the center, after which they may be adjusted with the jambs without interfering with the adjustments at the center, and single doors can be adjusted so that they will be plumb with both jambs.



Novelties.—Fig. 1.—Luitink's Adjustable Door Track and Hanger.

Self Feeding Rip Saw.

A machine which the manufacturers strongly recommend for wood working plants desiring a heavy and powerful self feeding rip saw of large capacity and adapted for hard and continuous service is illustrated in Fig. 2 of the engravings. It is made by Cordesman, Meyer & Co., 53 Central avenue, Cincinnati, Ohio, and has a capacity for ripping up to 6 inches thick and 21 inches wide. The frame is iron and has a broad floor support, insuring smooth and steady running. The table, 36 x 72 inches in size, is of iron and is raised and lowered by means of a crank handle convenient to the hand of the operator and is always perfectly level. The method of construction for raising and lowering the table is designed to insure absolute rigidity, minimum wear and freedom from vibration. The rise and fall of the table is said to be a trifle more than 5 inches. An important feature of the machine is the new improved fence, which, it is pointed out, is thoroughly reliable, quickly adjusted and very convenient, as only one handle is used for releasing, moving and locking. The feed works are heavy and powerful, special attention having been given to making all parts durable. The feed is driven from a mandrel and consists of a feed spur in front of the saw and a driven corrugated out-feeding roll, provided with steel spreader, at the rear of the saw. The frame carrying the out-feeding roll has an adjustable weight, effecting a positive discharge of material. There are three rates of speed, which are claimed to be under perfect control, and can be instantly stopped and started, while the feed works can be raised or lowered without the operator leaving his position in front of the machine. The mandrel is 1 11-16 inches in bearings and will accommodate several saws. The pulley is 8 x 8½ inches and can be belted from any direction. The outside bearing is exceptionally heavy, double braced and extra strong, affording powerful support to the outer end of the spindle.

The Electric Floor Scraper.

Among the recent candidates for popular favor in the way of floor scrapers is a device which has recently been placed upon the market by Cobbs & Mitchell, Incorporated, Cadillac, Mich., and a general view of which is presented in Fig. 3 of the illustrations. The concern in question makes a specialty of thin maple, beech and birch flooring, and has therefore been compelled not only to study the manufacturing of flooring, but also the best process for laying and finishing. It is a well-known fact that the best flooring may readily be spoiled by improper laying and finishing, and it is also universally recognized that few workmen really enjoy scraping a hardwood floor, as it is decidedly disagreeable work. The problem which confronted the manufacturers was to find or invent a tool which would reduce the expense and the disagreeable features of the work to a minimum, and at the same time furnish the tool at such a moderate price that every carpenter could afford to have one. After prolonged investigation of the subject the Electric floor scraper was evolved and is offered as "a big improvement over the plane and hand scraper," and will, it is stated, do all that is claimed for it. The particular merits of the Electric floor scraper are said to be found in the fact that it does superior work; that it saves time, and reduces the expense of floor smoothing, and that there is nothing about the tool that can wear out except the blades, of which six are furnished—four for the first cut and two for the finishing cut. The scraper is operated by two men, one pulling the tool by the long handle, while the other holds and guides it by the two short handles. The latter can be thrown to an upright position when working close to baseboards, walls, &c. In a neat folder which the manufacturers have issued are full and explicit directions for using the scraper in question.

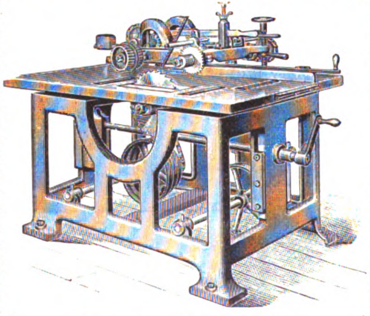


Fig. 2.—Self Feeding Rip Saw.

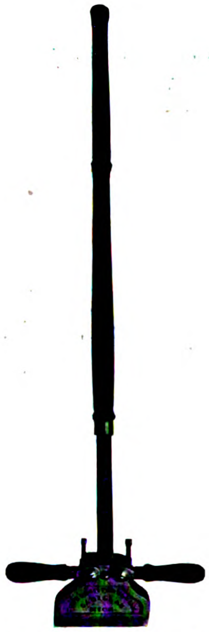
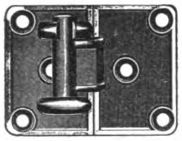


Fig. 3.—The Electric Floor Scraper.

Beaver Finished Wall Board.

A material that is growing in interest with architects, builders, decorators and house owners generally is what is known as Beaver finished wall board, recently placed upon the market by the Beaver Mfg. Company, 85 Eagle street, West, Buffalo, N. Y. The material is a combination of selected fibres chemically treated and reduced to a pulp and made into a solid, compact board under heavy pressure, on which is placed a sized mat finish. The claim is made that the material will not crack nor get out of shape; that it is strong and rigid, and that it makes a "perfect wall and ceiling." It is a nonconductor of heat and cold; eliminates the dangers that are common to damp walls; is light and durable, and as opposed to plaster and wall paper, the manufacturer states that it is not only cheaper and more attractive, but also more satisfactory in every respect. It acts as a sound deadener

and may be nailed direct to studding, completely replacing lath, plaster and wall paper. It is sanitary, quickly applied and gives beautiful artistic effects. In fact, the wall board is designed to successfully overcome all the objectionable features of a plastered wall, and will take any tint or color of paint, as it contains no acid to eat the coloring material. For bathrooms and kitchens the company has especially prepared waterproof paint adapted for this use. It is also particularly adapted for sleeping rooms, sewing rooms and nurseries on account of its sanitary properties. It can also be employed to excellent advantage for wainscoting in the artistic decoration of dining rooms. Another point is that it can be applied directly over the plastered walls of any house, a heavy beading being placed over the top. As showing its strength, the company points out that a test has demonstrated that a board when nailed to studding 16 inches on centers will withstand a pressure of 440 pounds applied at the center. The board is made in sheets of 32 x 36, 32 x 48 and 32 x 54 inches, these sizes covering all ordinary requirements. Special sizes can be furnished on request. A little pamphlet which the company has issued sets forth the merits of the Beaver Finished Wall Board and presents interior views showing the manner in which it may be used, as well as some of the artistic effects which may be produced in colors. The company is also sending out a folder containing a few hints for using Beaver tints and deep colors, and samples are given, so that the architect and builder may readily see the effects produced with the different tints.


Novelties.—Diehl Storm Sash Hangers and Fasteners.—Fig. 4.—General View of Hanger.

Diehl Sash Hangers and Separable Hinge.

We show herewith a form of storm sash hanger and fasteners, together with a separable hinge, which are being manufactured and sold by the Diehl Novelty Company, Sheboygan, Wis. The hangers shown in Fig. 4 are of the ball and socket construction and made of malleable iron. The sockets are placed upon the upper window casing and the parts containing the balls are placed upon the upper end of the storm sash or screen, so that the sash can be hooked on either at right or left angles and swung around in position conveniently without twisting or mutilating its form. The fasteners, also shown in Fig. 4, are claimed to be made of the best steel spring wire and are so constructed that the sash cannot be blown off when extended. Claim is also made that the fastener locks with a powerful tension, without splitting or injuring the blind stops, so that when the sash is closed and locked it is perfectly tight. In the application of the fastener to the sash the slotted arm is fastened to the sash from 8 to 10 inches above the window sill, with clips designed for that purpose. The button is placed in the slotted arm when raised in a perpendicular position and allowed to rest in the bottom of the arm, where it is fastened to the blind stop. The separable hinges, indicated in Fig. 5, are made of malleable iron and are so constructed that doors can be taken off without removing the hinges, thus saving time and labor.

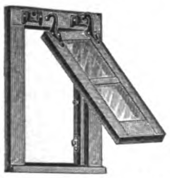


Fig. 5.—Diehl Separable Hinge.

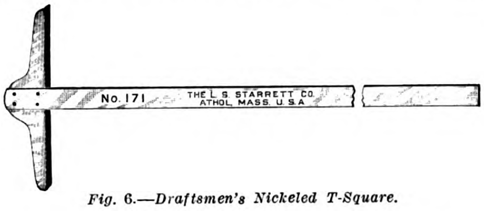


Fig. 6.—Draftsmen's Nickeled T-Square.

The C. C. C. Saw Clamp.

C. W. Cardwell, 51 Johnson avenue, Jamaica, N. Y., is offering the trade the saw clamp shown in Fig. 7. The frame is made of the best gray iron, japanned, while the clamping bar of rolled steel is completely covered with rubber. The rubbber covering is referred to as holding the saw rigid, as taking up all vibration, thus saving in the cost of files and rendering the operation of filing practically noiseless. The clamp weighs a trifle over 1 pound and can be carried in the pocket conveniently. Among the points of excellence mentioned by the manufacturer are simplicity, lightness, durability, efficiency and the small space occupied.

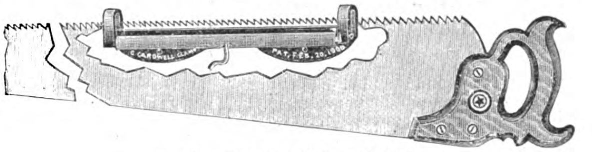


Fig. 7.—The C. C. C. Saw Clamp.

Plant of Ideal Concrete Machinery Company.

Handsomely printed on a good quality of calendered paper and profusely illustrated by means of well executed half-tone engravings is the souvenir of the plant of the Ideal Concrete Machinery Company, South Bend, Ind., which is being distributed among its friends by the concern in question. The pages measure 13¾ x 10¾ inches in size and are confined in ornamental paper covers tied with a silken cord. The introduction consists of a brief history of the business of the company, together with a list of the officials and their former connections. The plant is described somewhat in detail, special reference being made to the Ideal machine for turning out hollow concrete building blocks. The statement is made that a new machine, known as the "Ideal Special," has been placed on the market, and that it will produce all sizes of large stone, such as sills, lintels, steps, water tables, &c. The machine is adjustable to an extreme length of 60 inches, a width of 18 inches and a hight of 8 inches. We understand that the company is working on concrete mixers, which are being rapidly perfected and which will soon be placed on the market. One page is devoted to a group of portraits of the officers and directors; another represents a general view of the building occupied by the company, while others show full page views of interiors of the different departments. Several pages at the close are devoted to illustrations of the machines manufactured.

Draftsmen's T-Square No. 171.

The L. S. Starrett Company, Athol, Mass., and 123 Liberty street, New York City, has just added to its large stock of mechanics' fine tools the draftsmen's T-square No. 171, shown in Fig. 6. It is very light, made of steel, polished and nickeled, and is well suited to use in manual training schools, colleges, &c., as well as by the professional user. The head is struck up from sheet steel, the face of which is ground straight, as is the reverse side, for use either way. The blade, 0.045 inch thick and ⅞ inch wide, is spring tempered and riveted on top of the head, so that the blade forms a bearing to guide a draftsman's triangle, &c., back past the face of the head, not striking against it, as would be the case if the blade was sunk flush with the head. The instrument is both light and accurate, the 14-inch size weighing only 5 ounces, and 5½ and 6 ounces for the 16 and 18 inch sizes, respectively, the three sizes all having 8-inch heads.

The Sy-Clo Water Closet.

More intelligent consideration has been given to the selection of plumbing fixtures within the last five years than was ever given before. The plumber has rendered an invaluable service to mankind through the perfection of the house drainage system, and with the appreciation of the necessity of equipping their homes with a proper piping system has come the desire for all the fixtures used in connection with it to be of the perfect type. Recognizing this interest of those who are adding some luxury to the conveniences formerly procured the Potteries Selling Company, Trenton, N. J., has developed the Sy-Clo siphon jet water closet. This closet, it is said, is manufactured as carefully as a fine chain plate or pitcher, but is made a great deal stronger. When the clay is given to the potter he makes the closet by the hand mold process and it is tested before it gets into the furnace. In design, as well as in the details of the construction, care is taken to present an attractive

appearing as well as a properly operating fixture. The reader will be interested in the fact that the Sy-Clo closet is a double action overflow and siphon closet. By this means the entire surface of the bowl is scoured and washed out in discharging, and by means of the siphon tube connecting at the base of the body of the water in the bowl a jet of water starts siphonic action. This is to empty the closet of its contents quickly so that on the refill only clean water occupies the bowl. The method of discharge provides a pushing force and then a pulling force to insure against disagreeable contingencies. The large body of water held in the closet bowl lends the opportunity for cleanliness, affords an effective barrier against the entrance of air from the sewer line and acts as an absorber of odors so that local venting is held to be unnecessary. In addition to the care taken in making the closets to the end that the internal waterways will be smooth, care is also taken to preserve a uniform size of the waterway through the closet, so that anything which will pass at one point is sure to pass through all others and cause no trouble from stoppage or lodgment. A sectional view of the device is shown in Fig. 8 of the cuts.

Novelties.—Fig. 8.—The Sy-Clo Water Closet.

New Treatment for Oak Finish.

A chemical compound which it is claimed adds to the wood the color producing compounds of which it is deprived in the drying process is being brought to the attention of architects and builders by the Walter K. Schmidt Company, 84 to 88 Canal street, Grand Rapids, Mich. The compound is known as Fumine, and is claimed to give to wood treated with it a rich oak color all ready to be finished to any depth of shade that may be desired. By varying the proportions of the solution of Fumine and water different shades of oak will result. The claim is made that the compound is inexpensive and that the builders and decorators can produce fumed oak after the interior wood work is in place and that doors and sashes may be treated with the material after they have been hung. It is only necessary to coat the entire wood work at night with the Fumine, place three or four pans of ammonia water in the room and then close everything tight. In the morning the wood is ready to be finished. The point is made that Fumine also works on ash, maple and yellow pine and that the results are always uniform and absolutely reliable. A circular which the company has issued illustrates and describes a fuming box that is being presented for the benefit of those who are not equipped with one.

Keighley Metal Ceilings.

The Keighley Metal Ceiling and Roofing Company, located at 514-516 Atlantic avenue, Boston, Mass., are finding quite a demand for their line of metal ceilings. They have a large variety of designs, all of which are entirely new. They are furnishing ceilings for 12 rooms in the Penobscot Exchange, Bangor, Maine; for the new Business Men's Club, Stafford Springs, Conn.; for two stores for Miss L. E. Cleary, Maynard, Mass.; a large church at Richmond, Maine; Red Men's Hall at Nantucket, Mass.; several stores for the Rockland Savings Bank, Rockland, Mass.; Town Hall at East Machias, Maine, and West Medway Baptist Church, West Medway, Mass., besides many others.

Short Socket and Tanged Firmer Chisels.

Peck, Stow & Wilcox Company, Southington, Conn., and 27 Murray street, New York City, has perfected several lines of chisels, which are now on the market. Among them are short socket firmer or socket pocket chisels. They have a 3¼-inch blade and are particularly handy and serviceable for light work and for use where a long blade chisel is unsuitable, the short blade enabling the mechanic to get close to his work. They are made in 12 widths, ⅛ to 1¾ inches, inclusive and in sets of six, ⅛ to 1¼ inches, and eight, ⅛ to 1¾ inches. They can be supplied with either plain or beveled backs and with leather capped handles if so ordered, packed in slide cover wood boxes. They are also put up in sets of six, one each ¼, ½, ¾, 1, 1¼ and 1½ inch bevel back, in fancy hardwood box with hinged cover, No. 16, and in a canvas roll lined with colored canton flannel containing same number and sizes with hickory handles and bevel edges, No. 26. Of much the same character are the socket firmer butt chisels, with 2½-inch blades and ¾, 1, 1¼, 1½, 1¾ and 2 inch widths, either plain or beveled backs. The same style and sizes are also made in tanged firmer butt chisels, plain or beveled backs, both in solid sizes or assortment of six in slide cover wood boxes.

Morgan's Veneered Doors.

Some very handsome illustrations of veneered doors are shown in a publication sent out under the title, "A Perfect Door," by the Morgan Company, with main office and factory at Oshkosh, Wis., and with distributing houses in Chicago, Ill., Baltimore, Md., and Foster City, Mich. The little work has been issued in such shape as to be most useful to architects and users of veneered doors, and to that end the company has selected a few designs that are adaptable to the different kinds of architecture in use at the present time, made in various kinds of woods. The photographic reproductions of doors which are presented show in an admirable manner the grain of the wood, indicating the beautiful effects produced in a finished door, but the company points out that the wood itself must be seen in order to be fully appreciated. The designs embrace what are known as Craftsman doors, two, three, four, five and six panel doors, Colonial, Renaissance and Empire doors, front doors with oval lights, Queen Anne vestibule doors, storm doors, &c. The entire arrangement is exceedingly attractive, and architects will find the work a valuable addition to their collection of trade literature.

The Miracle Cement Building Block.

A comprehensive catalogue exploiting the machinery, molds and parts for making the double staggered air space cement building blocks, sewer pipe and tile, brick and sidewalk tile has been issued by the Miracle Pressed Stone Company, Minneapolis, Minn. Its 88 pages comprehend extremely useful and valuable information for the makers of cement blocks and the contractor and builder as well, and the cost of manufacture and the investment features are treated in full. The double staggered air space block, shown in Fig. 9 and manufactured on machines made by this company, is claimed to be frost and moisture proof. A complete hollow wall is obtained by the use of these blocks, as all the solid sections are backed by air spaces having absolutely no direct connection between the interior and exterior walls. The air spaces register exactly, so as to create two series of the perpendicular, continuous air chambers throughout. Views of 69 blocks that can be made on one machine outfit are shown, and include chimney blocks with one or two flues, porch piers, water table, corner, keystone, partial and full gable and regular blocks of various sizes and design of face. Other outfits are designed for the making of octagon or bay window blocks, porch piers, chimney blocks, columns, &c. The section on special molds includes wreath belt courses, vertical and horizontal tooled blocks, ornamental baluster, Grecian columns and designs for producing artistic effects. Views of conveniently arranged plants for the manufacture of cement blocks are also given, and will prove of interest to those contemplating the erection of a plant, as well as the contractor already identified with this industry. The manufacture of cement sewer pipe in special molds made by this company and concrete brick and sidewalk tile, are exhaustively treated in their varying phases. A full line of tools for this trade is also shown, including hand power mixers, concrete block cars, air tampers, sidewalk tools and building appliances.

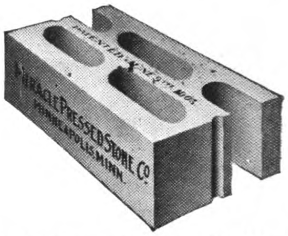


Fig. 9.—Cement Building Block Made by Miracle Pressed Stone Company.

TRADE NOTES.

THE WAGNER MFG. COMPANY, Cedar Falls, Iowa, is favoring its friends in the trade with an interesting booklet entitled "Practical Devices," in which is set forth the merits of the leading specialties turned out by this concern. Among the number may be mentioned the Daisy automatic door strip, the Wagner building bracket hanger, the Daisy automatic steel barn door latch, together with ice chippers, steak pounders, cake turners, &c.

TRUE & TRUE COMPANY, extensive manufacturer of millwork, Chicago, Ill., early in the year utilized an attractive poster calendar for the purpose of calling attention to the facilities enjoyed for turning out work in the line indicated, and at the same time presenting illustrations of some of the more important buildings in connection with which its millwork had been used. Some of these buildings of Gothic architecture called for the use of 184 different designs of moldings, every one requiring a special cutter. There were also seven large Gothic arches, each of which consisted of 15 molded members of intricate detail. Each leaf of the calendar was utilized to give in addition to the days of the week and the month

some interesting particulars regarding important work which the company had executed.

A POCKET MEMORANDUM BOOK which is being sent out by A. W. Hight, Toledo, Ohio, carries some interesting information relative to Hight's Union combination square, without which it is claimed no carpenter's kit of tools is complete. Among the information given are tables showing the length of braces or rafters from 1 foot to 30 feet base and 1 foot to 20 feet rise, expressed in feet, inches and 16ths. This square is nickel plated and will be found exceedingly useful to wood workers generally. It is a combination of try square, bevel, butt and marking gauge and miter, all in one.

THE AURORA, ELGIN & CHICAGO RAILWAY COMPANY has on its boiler house 14 48-inch glass top ventilators of the Burt type, made by the Burt Mfg. Company, 300 Main street, Akron, Ohio.

THE R. Z. SNELL MFG. COMPANY has just been incorporated at South Bend, Ind., for the purpose of manufacturing concrete mixing machines and apparatus necessary or useful in mixing concrete and other building materials. The capital stock is placed at $50,000, and the directors for the first year are R. Z. Snell, Sadie M. Snell, John Foster, Henry F. Krueger and L. A. Grange, all of South Bend.

THE statement issued monthly by the Ideal Concrete Machinery Company, South Bend, Ind., is not only a unique piece of business advertising, but is an evidence of the enormous strides made by this firm in the sale of their Ideal block machines and allied products. Their March Bulletin was recently received, and under the heading, "Straws Which Show the Way the Wind Blows," we find 207 shipments, reaching into 29 States—one being a solid carload, and two shipments going into Cuba.

THE April issue of *Graphite*, published by the Joseph Dixon Crucible Company, Jersey City, N. J., contains much interesting matter concerning Dixon's graphite productions, and among other things makes mention of the fact that Robert A. Brown, one of the company's traveling staff, has just started on a trip which will include Australia, China, Japan, Philippine Islands, India, Africa and other foreign countries.

THE MIRACLE PRESSED STONE COMPANY, Minneapolis, Minn., calls attention in its advertising space this month to the "great opportunities in the manufacture of Miracle double air space cement blocks." Reference is made to some of the merits claimed for this building block and builders can secure full particulars from the company's 84-page catalogue, a copy of which will be sent free on application. The Eastern branch of the company is at No. 1 Park Row, New York City.

THE BURT VENTILATOR, which has been on the market for nearly five years and used by prominent concerns throughout the country, is the subect of an announcement presented in another part of this issue by the Burt Ventilator Company, 301 Main street, Akron, Ohio. A feature of the ventilator is the sliding sleeves damper, which it is pointed out is ideal where glass tops are used, as the ventilator can be closed, yet the skylight feature is always free and open. The claim is made that with the use of this device the temperature can be better regulated; that the damper never moves and never collects dust. It is made in all sizes, both glass and metal tops, and is a device in which architects and builders cannot fail to be interested.

THE NATIONAL ROOFING COMPANY, Tonawanda, N. Y., shows in its advertising space this month a roll of its built-up gravel roofing ready to lay. The goods are offered under the name "Security," which is registered in the United States Patent Office. Special attention is called in connection with the roofing to the patent 6-inch joint.

THE PEERLESS BRICK MACHINE COMPANY, 10 Sixth Street, North Minneapolis Minn., is directing the attention of builders to the Peerless cement brick machine, for which many claims are made. It is pointed out that the machine is so simple that one man can operate it, producing ten perfect face or common brick at a time. It is constructed of iron and steel and has a capacity ranging from 3000 and upwards per day. A catalogue which the company has issued will be sent to any contractor or builder who may be interested.

HENRY FRED SCHMUL, Niagara Falls, N. Y., offers in his advertising card this month to furnish 8 x 10 inch blue prints of 250 Buffalo residences, in stone, brick, frame, &c., at $1 per dozen. He states that catalogue and sample blue prints will be sent free to any address on application.

THE AMERICAN SCHOOL OF CORRESPONDENCE, Chicago, Ill., presents in its page advertisement this month some interesting particulars regarding a new work which it has brought out, under the title "The Five Orders of Architecture." The work consists of one large volume of text, of over 400 pages, handsomely bound and illustrated, with over 300 drawings, consisting of sections of moldings, cornices, columns, elevations, plans, &c., all drawn to scale, together with a number of full page photographs of the best examples of Greek and Roman architecture. The work is invaluable to carpenters and contractors, as well as draughtsmen and architects, who desire to know how to proportion columns, cornices, gables, balusters and other details in the various styles of architecture. The proposition which the school makes cannot fail to interest a large class among our readers.

THE HART SASH HOLDER COMPANY, Lexington, Mo., is offering the trade a burglar proof sash holder for which many claims are made. The device is referred to as neat and durable, is easily attached to any window, with or without weights, and is of such a nature that its use prevents the window from rattling, by holding it securely and firmly against the jamb. The claim is made that by means of the device the window may be held at any desired hight to admit air and will lock and securely hold the sash from being raised or lowered by any one on the outside, thus making it burglar proof. A leaflet which the company is sending out illustrates and describes the device and at the same time gives directions for fitting the lock to the window.

SOME very interesting information relative to Cortright metal shingles is found in the May issue of the *Advocate*, published by the Cortright Metal Roofing Company, Philadelphia, Pa., and Chicago, Ill. The merits of the shingles in question are set forth in convincing style, and numerous testimonial letters show the estimation in which these goods are held by those who have practically demonstrated their merits. Interspersed among the technical matter is more or less "light" reading of a humorous nature.

A FACT which will be found of special interest to builders throughout the country and to manufacturers of hollow building blocks especially is that the largest building constructed of hollow blocks in Alameda County, California, is reported to have been uninjured by the earthquake which visited that section of the country on the morning of April 18. According to the Ideal Concrete Machinery Company, South Bend, Ind., who furnishes us the information, the building in question was the four-story paper box factory of Wempe Brothers, at Fifth and Adeline streets. This structure, it is said, has probably a larger percentage of window openings than any building of its class in the State, being designed especially with a view to affording ample light to all parts of the structure. There was also a church on Waller street, San Francisco, near Golden Gate Park, constructed of building blocks, which is said to have stood, without any apparent damage.

THE HAYWARD BUILDING, San Francisco, is an object of interest to the building crafts at present, on account of having survived almost unscathed the effects of both the quake and the fire which followed. This building, 11 stories high, stands a monument to the efficiency of steel construction and to the system with which it was fireproofed. Although its neighbors were all shaken or burned to the ground, this structure can be restored to its original condition for the comparatively trifing sum of $5000 to $8000. The "Prong Lock Wireless" fireproofing system, which was used in the Hayward Building, is being specified by many leading architects and engineers, and the patentees and manufacturers, the Berger Mfg. Company, Canton, Ohio, are shipping considerable quantities of it.

IN order to meet the growing requirements of its business, Hartmann Brothers Mfg. Company will in the near future move its large plant, at present located on the north side of West Lincoln avenue, Mount Vernon, N. Y., to a site just beyond the Harlem River Railroad tracks and between them and the Bronx River. The tract comprises ten acres, running from a point about opposite Howard street to a point near Grand street. The property acquired has a frontage of 2500 feet along the Harlem River Railroad and the new plant will be very much larger than the present one and will possess four times the capacity. When the improvements are completed the company will have one of the largest lumber yards and plants of its kind in this section of the country.

E. C. ATKINS & CO., Indianapolis, Ind., had a branch house at 21 and 23 Main street, San Francisco, Cal., which was located right in the track of the conflagration, and the building and stock, consisting of a complete line of circular, band, cross-cut, hand and other saws, mill specialties, &c., was a complete loss. R. W. Neighbor, the energetic San Francisco manager, opened a temporary office at 1055 Broadway, Oakland, and was ready for business on the 20th ult. N. A. Gladding, vice-president and secretary of the company, who has just returned from a trip to the stricken city, after studying the situation carefully decided to lease a wareroom at 862 Market street, Oakland, which will be the San Francisco branch until further notice. Mr. Gladding was fortunate in securing large, well lighted premises, with ample room and admirably adapted to the company's needs.

MUCH valuable information relative to the construction and capacity of windmills, which may be utilized for a variety of purposes, is contained in an attractively arranged and printed catalogue of 64 pages, sent out by the Flint & Walling Mfg. Company, Kendallville, Ind. Within its covers the merits of Star windmills, towers, tanks and pumps are set forth at length, with illustrations, which are of special interest in this connection. Special reference is made to suburban outfits as well as to what are designated as the Star Institute outfits, the latter being intended for use by orphan asylums, homes for the aged and institutions of all kinds. The suburban outfit is especially adapted for the farm, the city or the suburbs, and the point is made that a country home is incomplete without such a system. The details of construction are so clearly set forth that the catalogue in question cannot fail to prove of interest to a large class among our readers.

THE CONTRACT for about 700 squares of metal ceiling for the six double barracks at Lawrence, Ind., has been let by Heinzmann Brothers, the contract calling for the Lock-Joint construction of the S. Keighley Metal Ceiling & Mfg. Company, Pittsburgh, Pa. The Lock-Joint metal ceiling is specified for the Government work generally, as it has proven absolutely dustproof and airtight, an advantage which the Government engineers appreciate and which is bringing it into great favor with architects and builders throughout the country. A copy of its catalogue can be obtained by addressing the S. Keighley Metal Ceiling & Mfg. Company, Pittsburgh, Pa.

THE terrible fire and earthquake which devastated the greater portion of the city of San Francisco wiped out the entire business sections, destroying furnishings, stock and equipment of all kinds. William F. Casey, an architect at 486 Madrid street, San Francisco, Cal., desires to secure from concerns dealing in builders' supplies copies of their catalogues to replace those destroyed in the fire.

M'CRAY REFRIGERATOR COMPANY, Kendallville, Ind., has issued catalogue No. 81, illustrating and describing refrigerators for residences. In lining refrigerators with opal glass or tile, all joints are carefully fitted and joined together with Keene's cement, to make it impossible for anything to get between or back of the lining. The doors to the provision chambers are also lined with the same material as within the refrigerator. The walls are constructed with three thicknesses of lumber, three thicknesses of heavy moisture proof insulating paper, and a filling of mineral wool. Beneath the tile or opal glass lining is another thickness of heavy insulating paper, which also serves as a cushion for the lining.

AT the recent convention of Cement users, held at Milwaukee, Wis., many claims were made by the different manufacturers of concrete block machines regarding the results of their displays. We understand that one of the most elaborate and which attracted widespread attention on the part of visitors was that of the Ideal Concrete Machinery Company, South Bend, Ind. Not only were visitors interested in the machine turned out by this company, but many sales were made.

THE STAR CEMENT BLOCK MACHINE COMPANY, Dallas City, Ill., has incorporated with a capital stock of $5000 to manufacture cement block machines and other cement machinery. The incorporators are Claude J. Doty, William Yeocum and W. H. Bliss. A meeting for the election of directors of the company was held April 16.

A FOLDER of somewhat liberal proportions and carrying halftone illustrations of buildings of various kinds located in different parts of the country is being distributed among its friends by the Berger Mfg. Company, Canton, Ohio. It is stated that all the buildings shown on the folder were fireproofed with Berger's "Prong-lock" (wireless) fireproofing system, consisting of "Prong-lock" steel studs and furring, together with expanded metal or wire lath. The point is made that the character of the buildings indicates the ability of the architects who planned and the contractor who built them. The company has issued a book of information and prices regarding the system of construction in question, and those interested can secure a copy on application.

1.—*Apply Johnson's Electric Solvo with a brush. It will immediately soften all the old finish.*

2.—*Now remove the old finish with a putty knife.*

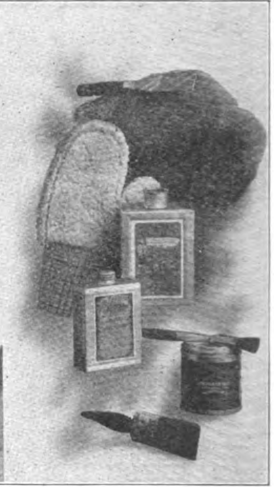
3.—*Using steel wool to remove the old finish from carvings and mouldings.*

4.—*Wipe the wood clean with a cloth saturated with benzine or wood alcohol.*

5.—*Now apply Johnson's Wood Dye, the desired shade, with a camel's hair or fitch brush.*

6.—*When dry spread on Johnson's Prepared Wax with a cloth.*

7.—*Bring to a polish by rubbing with a dry cloth or polishing mitt.*



8.—*Johnson's Electric Solvo, Wood Dye and Prepared Wax and these tools are all that is necessary to properly refinish all old wood, furniture, woodwork or floors.*

THE REFINISHING OF WOOD

To properly refinish all old woodwork, furniture, or floors we recommend the following preparations:

Johnson's Electric Solvo for removing old finish from wood, glass and metal. Apply with an ordinary varnish brush and then remove softened finish with putty knife and steel wool. Wipe clean with cloth damped with benzine or alcohol, leaving the wood bare and clear, ready for new finish.

List Prices:

Gallon Cans, $2.50; Half-Gallons, $1.25; Quarts 75c.; Pints, 40c., and Half-Pints, 25c.

Johnson's Wood Dye for the artistic coloring of all wood. Apply with a camel's hair or fitch brush. It will immediately penetrate the wood, properly coloring it. It does not raise the grain. With Johnson's Wood Dye inexpensive woods such as cypress, Southern and Western pine may be made as beautiful as hardwood. Made in the following shades: No. 130, Weathered Oak; No 131, Brown Weathered Oak; No. 132, Green Weathered Oak; No. 128, Light Mahogany; No. 129, Dark Mahogany; No. 172, Flemish Oak; No. 140, Manila Oak; No. 126, Light Oak; No. 123, Dark Oak; No. 110, Bog Oak; No. 121, Moss Green; No. 122, Forest Green; No. 125, Mission Oak; and No. 178, Brown Flemish Oak; **List Prices:** Gallons, $3.00; Quarts, 85c.; Pints, 50c., and Half-Pints, 30c.

Johnson's Paste Wood Filler for filling the grain of all wood, soft or hard. Our Natural Paste Wood Filler No. 10 should always be used when finishing all wood, soft or hard, natural. For shades of golden, dark or antique, antwerp or green antwerp use our Paste Wood Filler, the desired shade, instead of our Wood Dyes.

List Prices:

18c. per lb., in one-pound and two-pound cans: 12c. per lb. in twenty-five pound cans.

Johnson's Prepared Wax. "A complete Finish and Polish for all Wood." Entirely different from any wax finish on the market. It contains a very large percentage of hard polishing wax, making it easy to bring it to a beautiful and permanent polish. Applied with cloth and polished with clean dry cloth, polishing mitt, or when used upon floors, with a weighted brush.

We are very anxious that every painter become acquainted with the advantages of our leading specialties. To carry out this idea we make this free proposition to every reader of this magazine.

FREE OFFER: Send us, on coupon below, the name and address of your paint dealer, or better still his card, and we will ship you, express prepaid, sample cans of Johnson's Electric Solvo, Wood Dye, any desired shade, and Johnson's Prepared Wax Black These samples will not cost you one cent; all we ask is the card or name and address of your paint dealer. We must have this information. Don't delay—Send today.

S. C. JOHNSON & SON, Racine, Wis. "*THE WOOD-FINISHING AUTHORITIES*"

Coupon
C. B.-6.

S. C. Johnson & Son
Racine, Wis.

GENTLEMEN—My paint dealer's name is................

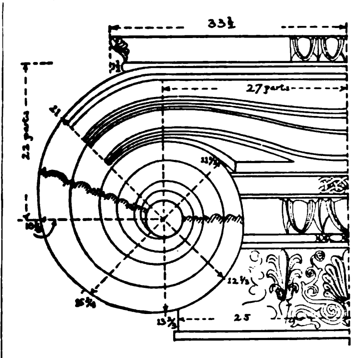
His address........................

Please send me, by express, prepaid, free samples of Johnson's Electric Solvo, Wood Dye, (state shade desired) ...., and Johnson's Prepared Wax Black.

I agree to test the samples and if I find them satisfactory I will insist upon my dealer supplying me

Name...

Address...



·IONIC·CAPITAL·
·PORCH··MINERVA·
·POLIAS·ERECTEVM·

The Five Orders of Architecture

A new work invaluable to carpenters and contractors as well as draftsmen and architects who desire to learn how to proportion columns, cornices, gables, balusters, and other details in the various styles of architecture, such as Doric, Ionic, Corinthian, etc. If you are drawing plans for houses you will find the plates invaluable for designing exterior and interior finish.

What the Work Consists of

The work consists of one large volume of text, over four hundred pages 8 in. x 10 in. in size, handsomely and substantially bound in half red morocco leather, and a handsome portfolio of fifty-eight plates 11 in. x 15 in. in size, carefully drawn to a scale and printed on heavy plate paper, convenient for reference. The text is illustrated with more than three hundred valuable drawings consisting of sections of moldings, cornices, and columns, elevations, plans, etc., all drawn to a scale with dimensions, and in addition a large number of full-page photographs of the best examples of Greek and Roman architecture It also contains a Glossary or list of architectural terms together with the pronunciation and definition, and a Bibliography or list of the best books relating to architecture.

Free for Examination

These books are compiled from our best instruction papers in architecture. The regular price is $15.00, but to acquaint the readers of Carpentry and Building with the value of our instruction in Architecture we will, for a limited time, reduce the price to $12.00 and send the books out on the following terms :

Our Proposition

We will send the books without a payment by prepaid express on five days' approval. If satisfactory send $2.00 and $2.00 per month for five months until the special introductory price of $12.00 is paid (if you prefer to pay cash in advance send $11.00); otherwise notify us and we will send for the books.

American School of Correspondence
CHICAGO, ILL.

COUPON—Cut Out and Mail To-day

American School of Correspondence,
Chicago, Ill.

Please send me on five days' approval, express prepaid, one set Five Orders of Architecture. If satisfactory I agree to pay $2.00 down and $2.00 per month for five months, otherwise I will notify you to transfer the books free. Cash with order $11.00 Money refunded if not satisfactory.

Name ....

St. and No. ....

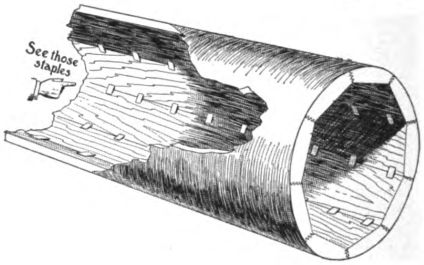
C. & B.
City.......................*State*...................June, '06

Mention Carpentry and Building.

THE ONLY PERFECT AND RELIABLE LOCK JOINT COLUMN MADE

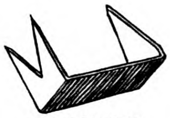
WRITE TO-DAY

PATENTS
PENDING



Columns are glued up under enormous pressure and then the staples are driven in as shown in illustration by our special machinery.

FREE OFFER On Receipt of Postal saying where you saw this Adv. we will send you postage paid a Sample Section of this Column showing the wonderful Lock Joint.



Cut of Staple is three quarter size.

THEY CANNOT OPEN AT THE JOINTS

Put them where you will, in the hottest room, the driest or dampest climate, they POSITIVELY WILL NOT OPEN. WE GUARANTEE IT.

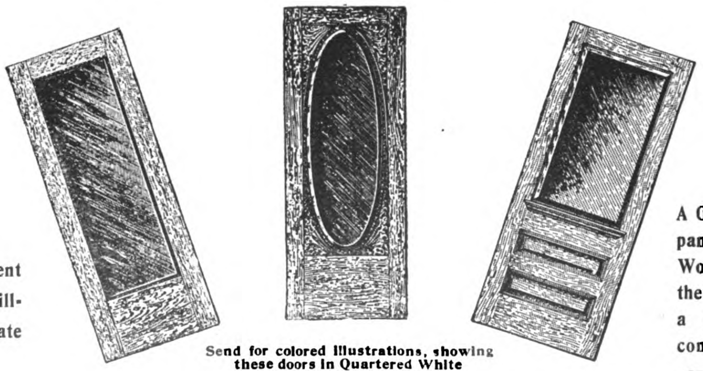
Made only by

AMERICAN COLUMN COMPANY, BATTLE CREEK, MICH.

DON'T TAKE SUBSTITUTES.

Our Line Of

Hardwood Veneered Front Doors



Send for colored illustrations, showing these doors in Quartered White Oak with net prices

A large assortment of all kinds of Mill-work for immediate delivery

A Guarantee accompanies every order. Workmanship is of the highest grade, as a trial order will convince

Carpenters and Builders This is a picture of Our 200 Page Catalogue, just off the press, and ready to mail upon request, WITHOUT CHARGE

Schaller Hoerr Co.
SASH, DOORS,
INTERIOR FINISH
MANTLES,
GRILLES,
HARDWOOD FLOORING,
PORCH WORK,
STAIR WORK
ETC. ETC.
CHICAGO, U.S.A.

6 x 9 Inches.
Over 700 Illustrations.

Schaller-Hoerr Company

416-426 Blue Island Ave., Chicago, Ill.

Don't Place That Order For MANTELS Until You Get OUR PRICES

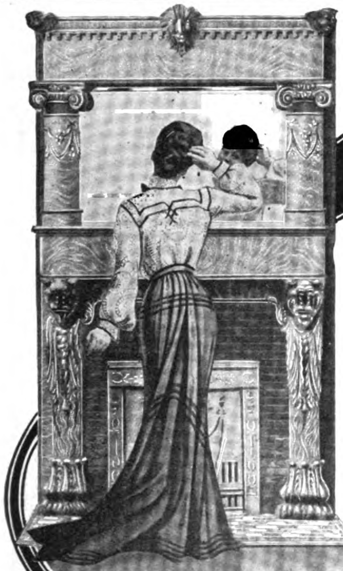
Tell us HOW MANY MANTELS you need and we will then send you our handsome catalogue free of charge.

You will find it an easy matter to make up your order at the very attractive prices we will name you.

TILES AND FIREPLACE GOODS
of every description.

Let us hear from you TO-DAY.

The A. W. Burritt Co., 400 Knowlton St.,
"The Mantel Folks," Bridgeport, Conn.



LORENZEN MANTELS AND GRILLES

Also contractors for Ceramic Mosaic and Tiles, Interior and Decorative Marbles, also manufacturers of Improved Scagliola for Bathrooms, Vestibules and Interior of Lobbies and Corridors in Banks, Libraries, Hotels and Public Buildings.

To Carpenters and Builders. FREE.

We will mail our large, handsome 96 Page (10 x 12) Catalogue, the largest Mantel and Grille book ever published which costs us nearly 50 cents. Send us your business card and we will show you a way to make money by becoming our sales agent for your territory.

Write To-day.

CHAS. F. LORENZEN & CO., Inc.
253 North Ashland Ave., Chicago.

We have just shipped a carload of our Mantels and Interior Finish to the United States Legation Buildings, Pekin, China.

LORENZEN PAYS THE FREIGHT

—WORDS OF GENIUS.—"To succeed," remarked the great merchant, "you need what is on that door."

"Push and Pull?" we ventured.

"No," he returned, "the device to make you shut up."

And while the portal swung back we understood that the interview was over.—*The Sun.*

HOW TO MIX PAINTS

¶ A simple treatise suited to the requirements of carpenters, builders and others, who have not had the benefit of long training and experience in the mixing of colors. It will assist the reader to match any given color. **Fifty Cents, Postpaid**

David Williams Company
14-16 Park Place - - NEW YORK

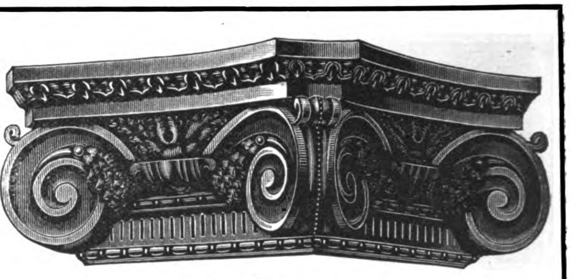
Wood Carvings

Hand and Machine Carvings, Mouldings, Festoons, Newel Posts Head Blocks, Rope and Twist Balusters and Ornaments. We also make a specialty of Fine Staved Up Quartered Oak and Birch Columns for Interior Work.

Almost 1,500 designs illustrated in our New Catalogue and Price-List No. 20. Mailed for 15c. in stamps.

Waddell Mfg. Co.,

Corner Taylor and Coldbrook Sts.,
GRAND RAPIDS, MICH., U. S. A.

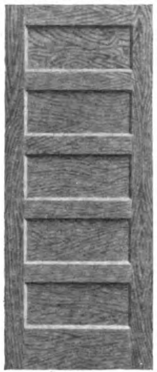


No. 0575

50% SAVED

OAK VENEERED DOORS IN STOCK ALL SIZES.

$ $ $ $ $ $ $



$ $ $ $ $ $ $

※ 774

MADE IN STOCK QUANTITIES, SOLD AT STOCK PRICES, CARRIED IN STOCK

THE FOSTER-MUNGER CO.

AMERICAS GREATEST SASH & DOOR HOUSE
CHICAGO, U·S·A·
WRITE FOR VENEERED DOOR BOOK 1448 A

KING MANTELS

Are strictly high grade mantels at the price of medium. A hackneyed statement, but true in this case, and possible because we are located in the heart of the hardwood country, with labor conditions much in our favor. All intermediate profits are eliminated. you are dealing with the manufacturer direct

Our little book, "Evidence," is proof, and will be sent free if you will state number of mantels wanted.

Our elegant 72 page catalogue (11 by 14 inches) of mantels, grates, tiles, etc., is the most complete book of its kind ever issued. This and our copyrighted supplement entitled "Colonial Beauties" both sent on receipt of 12 cents to pay actual postage

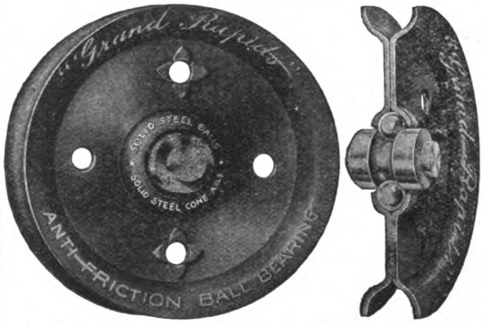
KING MANTEL COMPANY

652 Gay St., Knoxville, Tenn.

—"HANS, how long have you been married?"

"Vell, dis is a ting that I seldom don't like to talk about, but ven I does, it seems so long as it never vas."—*Exchange.*

PATENT PENDING.



"Ball-Bearing" Grand Rapids All-Steel Sash Pulleys

Are sold DIRECT to BUILDERS, CONTRACTORS and MILLS,

At prices under the common ordinary goods.

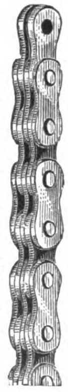
If you make ten or ten thousand window frames, we can save you money and give you a superior sash pulley. We are the largest sash-pulley makers in the world. We ship direct, or through dealers and jobbers everywhere.

Write for catalogue and free samples and prices on half-gross, gross, barrel or any quantity.

Direct from the Makers to you. Inquiries welcome.

GRAND RAPIDS HARDWARE CO.,

3 PEARL STREET, - - - GRAND RAPIDS, MICH.



THOMAS MORTON,

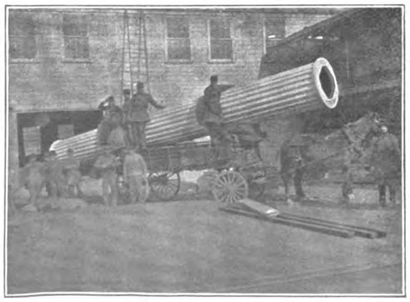
169 Elm Street, New York.

Copper Cable, Champion Metal,
Steel Cable, Steel Champion,

SASH CHAINS.

CHAINS

For Suspending Heavy Doors, Gates, etc.
All of SUPERIOR QUALITY.



THE LARGEST LOCK JOINT COLUMN EVER BUILT.

40½" in diameter, 33-10 in. long.

One of four furnished by us for the Portico of the Allenhurst Club, Allenhurst, N. J.

HARTMANN BROS. MFG. CO.

Mt. Vernon, N. Y., U. S. A.
New York Office: 1123 Broadway.
Also
Henry Sanders Co., Chicago, Ill.
A. J. Koll Planing Mill Co.,
Los Angeles, Cal.

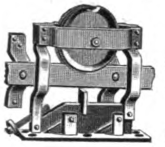
MANUFACTURERS OF

KOLL'S PATENT LOCK JOINT COLUMNS FOR PERGOLAS, PORCHES OR INTERIOR USE.

Send for Catalogue D 19.

"LANE'S BALL BEARING"

Is the best House Door Hanger made.



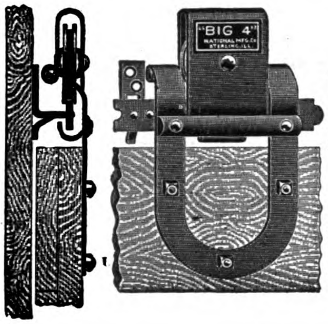
Has an ALL steel frame.

Cups, Cones and Balls are of the same material, made and hardened by similar processes as best bicycle parts.

Sold by the hardware trade. Send for circulars to

LANE BROTHERS CO.,

423-455 Prospect St., - POUGHKEEPSIE, N. Y.



"BIG 4" FLEXIBLE DOOR HANGER.

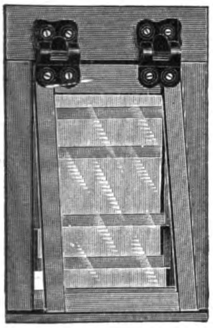
Anti-Friction. Cannot Jump the Track.
Exclusive Sale Given.

NATIONAL MFG. CO.,
STERLING, ILL.

Grand Rapids Wood Carving Co.,

GRAND RAPIDS, MICH.

Catalogue on application.



Full length window screens keep out all the flies and protect the windows. Screens attached with

GOSSETT'S
Detachable Suspension
HINGES

are easily put up or removed—no tools or ladder necessary. Write for free sample pair. Price per Doz. pairs $1.20 (Express paid),

Sold by Hardware and Lumber Dealers.

Manufactured by

F. D. KEES MFG. CO. Beatrice, Nebr.

GRILLES "Direct from Factory" MANTELS

No. 225—48x12 inches, **$3.60.** Retail value, $7.00.

No. 230—48x14 inches, with Curtain Pole, **$4.50.** Retail value, $9.00.

Others from $2.50 up. Largest assortment. Division Screens and special Grilles to order.

Tile and Mosaics
for everywhere.
Walls, Floors, etc.

$13.25 buys this solid oak Mantel, 80 in. high, 54 or 60 inches wide, 28 x 16 Mirror. Heavy columns and elaborate capitals. Tile facing and hearth with Plated Frame and Club House Grate, $10. extra.

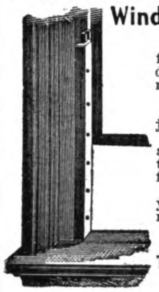
HARDWOOD FLOORS

will last as long as the house. Any carpenter can lay it easier than ordinary flooring. Get our prices.

Write for catalog of Mantels, Grates, Tiles for floors and baths, Slate Laundry Tubs, Grilles, etc. It is free. Or, send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from **$12** to **$200.**

W. H. OSTENDORF, - - - - - - - - 2417 N. Broad St., Philadelphia, Pa.

King's Automatic Weather Strip. Window and Door Stop.



The only perfectly satisfactory weather strip, window and door stop on the market.

Keeps out cold and dust.

Makes a perfectly tight joint.

Windows can be raised and lowered to desired position without the use of fasteners or of weights.

Do not build a house until you have investigated the merits of these strips.

Write for prices.

MANUFACTURED BY

The King Manufacturing Co.
Newton, Ia.

Full Instructions on Designing and Detailing Roof Trusses,

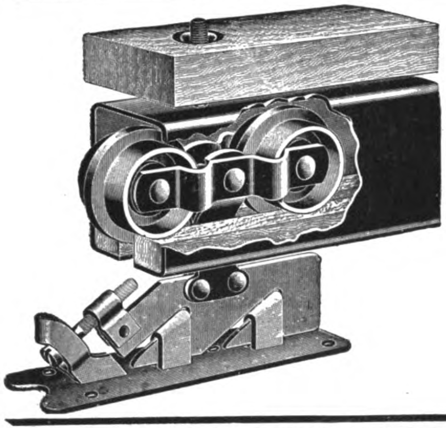
Accompanied with 164 Illustrations, in the new book,

Kidder's Strength of Beams, Floors and Roofs.

POINTS out mistakes and faults commonly found in truss design. Gives examples showing a variety of roof trusses adapted to different spans and conditions. Contains a very useful chapter on truss joints—how they should be made and how to estimate their strength.

Two Dollars Prepaid.

DAVID WILLIAMS CO., Publishers
14-16 Park Place, New York.



No. 122 ROYAL

DOOR HANGERS

Ball Bearing ❧ **Noiseless**

Simple in Construction

Modern Design

Accessible after walls are plastered

Write for catalogue of Door Hangers

MFG. CO. TRADE MARK

The Richards Mfg. Co.

AURORA, ILLINOIS

NEW YORK OFFICE, 101 READE STREET

NO. 850.

POINTS IN BUYING

PADLOCKS

A good padlock should have mechanism so designed that it cannot be picked, easy working parts, an obstructed keyway, strength of case and shackle, and a large number of key changes.

Yale & Towne padlocks are made in all grades retailing from $.40 to $2.00. All the better grades have the name YALE on the case.

The YALE No. 850 is known as the world's best padlock. It has the celebrated pin-tumbler mechanism with paracentric key, used in all Yale Cylinder Locks. This makes picking practically impossible. All working parts are carefully adjusted so that action is smooth and wearable to the full extent. The steel shackle and heavy cast bronze case afford great resistance to violence.

The pin-tumbler mechanism permits an almost unlimited number of key changes and makes master-keying easy without sacrificing security.

This padlock is extensively used by railroads, the U. S. Government, and large manufacturing concerns.

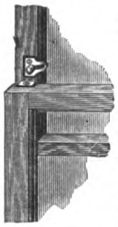
No better lock can be had for tool boxes, contractor's sheds, and stables

Write for "The Key to a Good Thing"—a little folder that illustrates the working of the pin-tumbler mechanism.

THE YALE & TOWNE
Manufacturing Company
9 MURRAY STEET, - NEW YORK

SPECIAL OFFER TO CARPENTERS

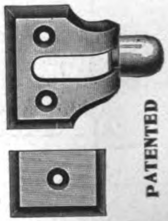
BUILDERS AND OWNERS OF HOMES



Ives Patent Window Ventilating Lock, a Safe-Guard for Ventilating Rooms, Pure Air, Good Health and Rest Assured.

To introduce this article, Four Ventilating Locks in genuine Bronze, Brass or Antique Copper Finish will be mailed to any address prepaid for One Dollar. Will include a forty page Hardware Catalogue and Working Model to Carpenters who wish the agency to canvass for its sale. Address

THE H. B. IVES CO. NEW HAVEN, Conn., U. S. A.



PATENTED

KIDDER'S STRENGTH OF

BEAMS, FLOORS AND ROOFS

HAS BEEN PREPARED ESPECIALLY FOR CARPENTERS, BUILDERS, ARCHITECTS AND DRAFTSMEN ❧ ❧

It treats in a way that any one familiar with common arithmetic can easily understand, of the method of computing the strength or bearing capacity of beams, floors and roofs, what forms of roof trusses are required, size of members, how to proportion joints and to figure strains and stresses.

The mechanical principles of the ordinary types of trusses are fully and clearly explained and also the methods of computing the stresses and proportioning the members to them. The chapter on truss joints should be of especial interest to builders and draftsmen, and even experienced architects, as it shows how the various joints should be made, and how to estimate their strength, a subject to which no writer has ever before given sufficient attention.

The book also illustrates quite a variety of wooden roof trusses adapted to different spans and conditions, and the author points out many of the faults commonly found in the design of trusses.

In view of the author's exceptional qualifications and the absence of any like source of information, this book is an important one and INDISPENSABLE TO THE MAN WHO AIMS TO MAKE INTELLIGENT USE OF BUILDING MATERIALS.

230 Pages, Illustrated with 164 Engravings from Original Drawings. Size $5\frac{1}{2}$ x 8 inches. Cloth Bound.

TWO DOLLARS, PREPAID.

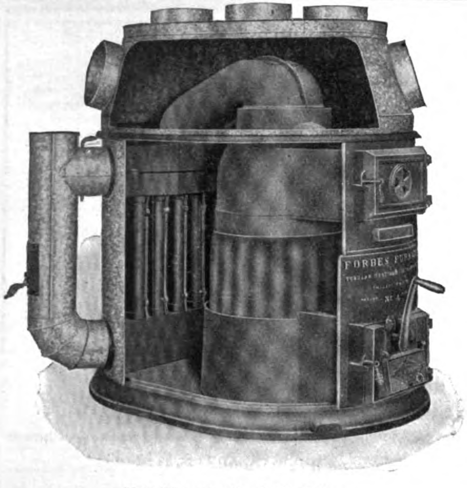
DAVID WILLIAMS COMPANY, - - **Publishers**
14-16 Park Place, New York

BOOKS. YOU CAN OBTAIN PROMPT ADVICE regarding the books on any subject in which you are interested by addressing DAVID WILLIAMS COMPANY, Publishers and Booksellers, 14-16 Park Place., N. Y.

Digitized by Google

Original from UNIVERSITY OF MICHIGAN

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google



Height over all, 4 ft. 3 in.

THE FORBES FURNACE

Burns Either Hard or Soft Coal

EVERY ONE GUARANTEED
IF PROPERLY INSTALLED

No Sheet Iron Drums—Entirely Cast Iron
—Radiating Drums 1-8 Inch Thick,
Will Wear for Years

YOU RUN NO RISK IN PUTTING IN THE FORBES FURNACE

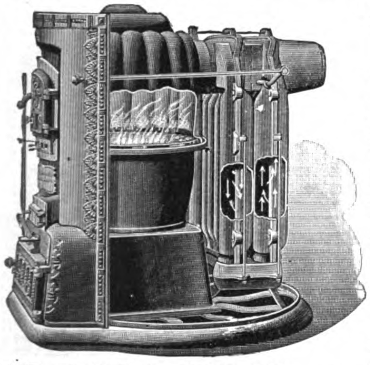
SEND FOR CATALOG AND FULL PARTICULARS

Tubular Heating & Ventilating Co.
228 Quarry St., Philadelphia

If it is well built it should be well heated. The Carpenter and Builder who is interested in high class work should insist that "INTERNATIONAL" Apparatus is used. See your local dealer. If he tries to substitute, write us.

INTERNATIONAL HEATER CO.,
MAKERS OF BOILERS AND FURNACES.
UTICA, N. Y.
New York. Boston. Chicago.

THE BEST IS THE CHEAPEST



The BENGAL FURNACE

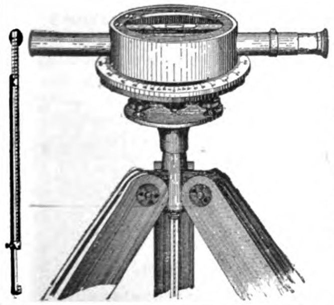
has stood the crucial tests imposed upon it in various places and always came out the victor.

The best evidence of its superiority is that imitators are trying to sell their wares on the merits of the BENGAL, saying it is "just as good."

There are none "just as good."

Full particulars on application.

THE FLOYD-WELLS CO., - Royersford, Pa., U. S. A.



WHAT BUILDERS HAVE BEEN LOOKING FOR

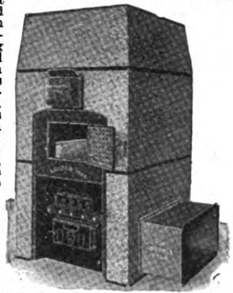
BOSTROM'S Improved Builders' Level

An absolutely reliable leveling instrument for Architects, Builders, Carpenters, and Stone Masons. Can be used for any kind of foundation work and getting angles, is simple in its construction, easily understood, and can be operated by any one. Is made of Brass, oxidized, and has a silvered circle of degrees. Has achromatic Telescope of ample power for such work. Price, including Plumb Bob, Tripod and Graduated Rod and Target, $25.00. Write for circular and be convinced. Every instrument guaranteed.

BOSTROM-BRADY M'F'G CO.,
53½ West Alabama Street,
Atlanta, Ga.

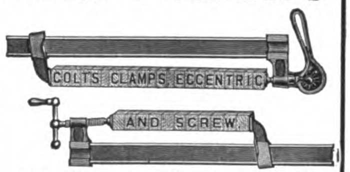
LEADER Steel Furnace $49

Our No. 45 Steel Furnace, without pipes or registers, we send anywhere, freight prepaid east of Omaha, for $49. You can't match it in your town for any such money. It will heat a house of 7 or 8 rooms, store, school or small church. Has steel body with riveted and lined galvanized iron casing. Has brick fire box. Regulated by chains. Burns soft or hard coal, wood or coke. Any man can set it up successfully, putting pipes, registers and smoke pipe in proper positions from our clear detailed descriptions. Don't pay others for what you can do as well yourself. Write for our instructive book, "Modern Furnace Heating," a 40-page book on the science of heating a house. It warns you what to avoid and how to benefit by the mistakes of others. Every house owner should have it. It's valuable. Send for it now. It's free.



Hess Warming & Ventilating Company,
709 Tacoma Building, Chicago, Illinois.

COLT'S CLAMPS



Quick Acting—Time Saving. We make 35 different styles of Clamps to meet the requirements of all classes of WOODWORKERS.

Ask for catalogue No. 129.

BATAVIA CLAMP CO.
23 Center St., Batavia, N. Y.

WORTHLEY'S
PATENT

SLOW FEED MANGER

17-Inch Size, $1.60 each.

U are welcome to a copy of our
VANE CATALOGUE

BROAD GAUGE IRON STALL WORKS,
53 Elm St., Boston, Mass.

SAWS

DO YOU BUY, USE
or
WANT TO KNOW
ABOUT SAWS?

THEN SEND FOR OUR CATALOGUE No. 1933,

describing Hand, Ship Carpenter's, Gauge, Mitre Box, Back, Dovetail, Joiner, Plumbers', Pruning, Compass, Keyhole, etc., etc. and also a number of pages of Saw Sets.

We also have a special 48-page Catalogue of Planes exclusively. This illustrates almost everything called Plane.
If interested ask for Catalogue No. 1934.

HAMMACHER, SCHLEMMER & CO.
HARDWARE, TOOLS and SUPPLIES,
NEW YORK, SINCE 1848.
4th Avenue and 13th Street, (Block South of Union Square.)

TOWER'S CHAMPION SCREW DRIVERS

FOR SIXTEEN YEARS THE ACKNOWLEDGED STANDARD.

Every Blade Is Tested to Split a Screw Head.

AVOID Imitations of CHAMPION Screw Drivers. None Genuine without the name "CHAMPION" which is our Trade Mark and Guarantee.

TOWER & LYON CO.
95 Chambers Street, New York.

"Forstner" Brace and Machine Bits

For Fine Carpenter, Cabinet and Pattern Work

Specially Adapted for Hardwood Working.

The Forstner Labor-Saving Auger Bit, unlike other bits is guided by its *Circular Rim* instead of its centre; consequently it will bore any arc of a circle and can be guided in any direction regardless of grain or knots, leaving a true polished surface. It is preferable and more expeditious than chisel, gouge, scroll-saw, or lathe tool combined, for core-boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon moulding and mortising, etc.

To introduce this high grade tool among carpenters, pattern makers, and others, we will mail to any reader of "Carpentry and Building," upon receipt of 50c. any bit we make from ¼ inch to 1 inch in size.

Manufactured by
The Progressive Mfg. Co., Dept. "A", Torrington, Conn.
Enquire of your Hardware Dealers or write us direct. Supplied in Sets. Write for Catalogue.

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

SASH CHAIN

CABLE CHAIN

JACK CHAIN

The SMITH & EGGE MFG. CO.

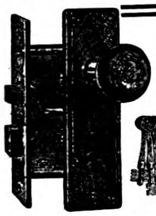
Bridgeport, Conn.

Manufacturers of "**Giant Metal**" **Sash Chains**
" " "**Red Metal**" " "

Cable Chains, Jack Chain, Bell Hangers' Chains
and Plumbers' Chains
Made in Brass, Copper and Steel

WRITE FOR CATALOGUES AND PRICES

We are the ORIGINATORS of SASH CHAIN as a SUBSTITUTE for sash cord



Builders' Hardware

FREE

Our Catalog with net prices sent to contractors and material men upon request.

New Illustrated Catalog and Net Price List.

This publication contains latest designs and finishes in builders' hardware, with over 1000 illustrations and 40 different designs in 15 different finishes.

REHM HARDWARE CO., 354 Blue Island Ave., Chicago, Ill.

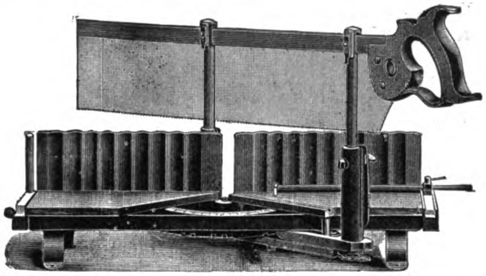
GOODELL MITRE BOX

**MADE ENTIRELY OF STEEL. NO MORE BREAKING.
FIRST IN QUALITY AND IMPROVEMENTS.**

**AUTOMATIC STOPS FOR HOLDING UP SAW.
CORRUGATED BACKS. GRADUATED.
GAUGE FOR DUPLICATE CUTS and many other features.**

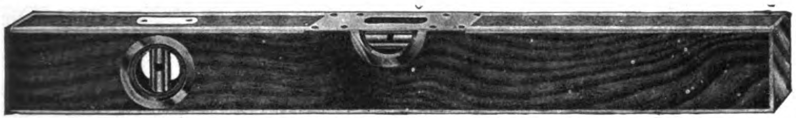
**If you want the best you will take no other.
Send for Circular K.**

GOODELL MFG. CO., Greenfield, Mass.



THE AKRON ECLIPSE LEVELS

Manufactured by **The BAKER McMILLEN CO.**
AKRON, OHIO.



We have a proposition that will interest every carpenter. Drop us a postal and we will send it to you.

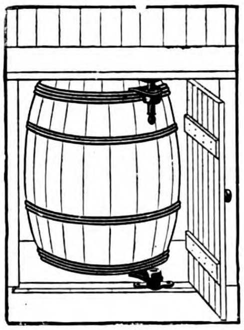
Extra Money for the Carpenter

is quickly and easily made installing the

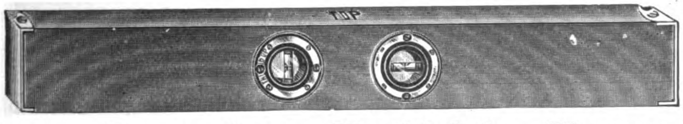
PERFECTION BARREL SWING

It will adjust to and swing any barrel—no matter how heavy. No more trouble removing moulding board or getting at flour—simply swing barrel out. Nothing better for pantry or cupboard—a child can use it. Simple and practical. If your Hardware dealer won't furnish them send to us.

THE LEAVITT MACHINE CO., Sole Mfrs., Orange, Mass.



COOK'S LEVEL



For Carpenters, Machinists, Masons.

MADE OF WOOD, IRON, ALUMINUM.

Of all Dealers, or Catalogue on Request.

EVERY LEVEL WARRANTED.

DAVIS & COOK, Watertown, N. Y.

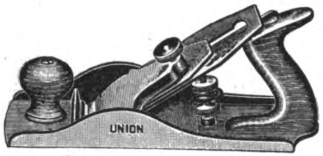
FURNACE HEATING.

By William G. Snow

With an Appendix on Furnace Fittings.

170 Pages; 90 Illustrations; Size, 6 x 9 inches.
Cloth bound. Price, $1.50.

DAVID WILLIAMS CO.
14-16 Park Place, - New York.



Union X4 Iron Smooth Plane.

THE GOOD WORKMAN DEMANDS

GOOD TOOLS

UNION "X" PLANES

Union X35 Wood Smooth Plane.

Supply that demand and it is not difficult to convince the Good Workmen of the Country that they are the Planes they want. They are rigid and solid, easy of adjustment, but a Plane that will "stay set" when adjusted.

A FIRST-CLASS PLANE

The cutters are of heavy steel and the same thickness throughout. This feature, together with the solid Frog, make a Plane that WILL PLANE. Every essential feature of it is right, and properly designed, and properly made.

Send for our No. 5 Catalogue, which shows the full line of Planes, Scrapers, etc, etc.
It will interest you.

Union No. X5 Iron Jack Plane.

Union Manufacturing Co.,
NEW BRITAIN, CONN., U. S. A.
WAREHOUSE: 108 Chambers St., New York.

Union No. X26 Wood Jack Plane.

Forest City Bit & Tool Co., Rockford, Ill., U.S.A

Manufacturers of Wood Boring Bits, Hollow Mortising Chisels, Common Mortising Chisels and Tools
Send for CATALOG "G" Send for

As plank frame barns are more extensively erected the builder will find of increasing usefulness a copy of the book

Plank Frame Barn Construction

By JOHN L. SHAWVER

Presents a complete system of framing which combines economy with advantageous features of construction.

ILLUSTRATED.
CLOTH BOUND.
Fifty Cents, Postpaid.

DAVID WILLIAMS COMPANY
14-16 Park Place, NEW YORK

HARGRAVE'S
BRACE SCREW-DRIVER

HARGRAVE'S TOOLS BEST

QUALITY.
FINISH.
DESIGN.

This we make of special steel, in four sizes, 1/4, 5/16, 3/8, 7/16 inch. We forge it round, thus enabling it to turn in a smaller space than any other shaped driver, and at the same time giving it the greatest possible strength. The point is ground transversely, preventing any slipping from the slot of screw-head. Well tempered and polished.

Specify these goods to your dealer.

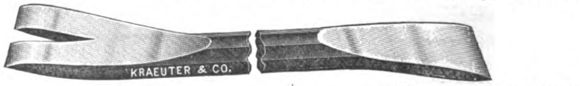
TAKE NO OTHER.

Write for Catalog No. 200.

THE CINCINNATI TOOL CO.
Norwood, CINCINNATI, O.

Will Not Bend.

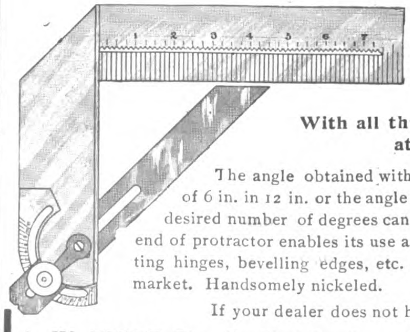
Hardened and Tempered.



30 in. and 36 in. long.

DEMAND one with our name on it, and have the BEST.

KRAEUTER & CO.
NEWARK, N. J.



PATENT APPLIED FOR

HIGHT'S UNION COMBINATION SQUARE

With all the Combinations Available at the Same Time

The angle obtained with its use is one that will give a rise of 6 in. in 12 in. or the angle for bottom of rafter for 1/4 pitch. Any desired number of degrees can be obtained instantly. The notch in end of protractor enables its use as a gauge for getting in corners, setting hinges, bevelling edges, etc. The best tool of its kind on the market. Handsomely nickeled.

If your dealer does not have them send $1.00 to

A. W. HIGHT, Sta. C., Toledo, O., or W. B. Colp, Ballard, Wash.

You Can't Get Along Without Them. Don't Try.

Thousands of mechanics have written us after receiving our books that they are simply indispensable to them, and they can be obtained so easily it is foolishness for anybody to be without them.

This book is most complete in information about wood working tools and

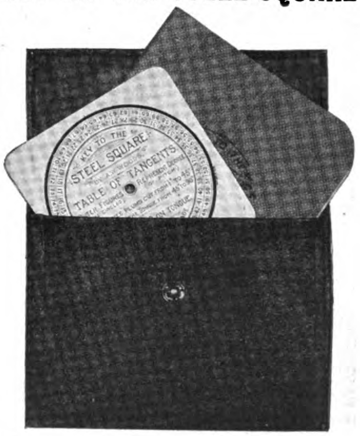
this one is just as complete and indispensable to anybody who wishes to post himself or to find out where to buy metal working tools, machinery and supplies.

Gladly sent to anybody anywhere on receipt of 25 cents each.

The Chas. A. Strelinger Co.,

Box B. **DETROIT, MICH., U. S. A.**

KEY TO THE STEEL SQUARE



THIS IS IT. The Key, Book of Instruction and Morocco Case. Full Size 4x5 Inches.

It tells the whole story of how to use the common steel square for all kinds of framing.

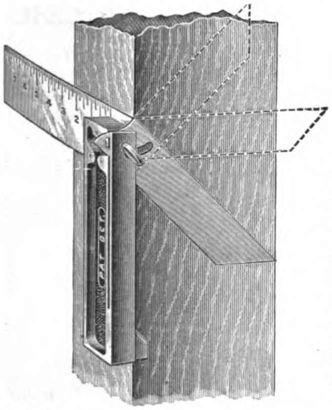
Ask your hardware dealer to see it. If he has not got it, send **$1.50** to

ALFRED W. WOODS,

LINCOLN, NEB. - **CHICAGO**
109 So. 10th St. 196 5th Ave.

SOMETHING NEW

Ideal Bevel Try Square



By having this combination try square you save time, also the price of one tool. You can see by cut how easy it is to change the bevel blade to any desired position to make the square and bevel cut with one stroke of the pencil.

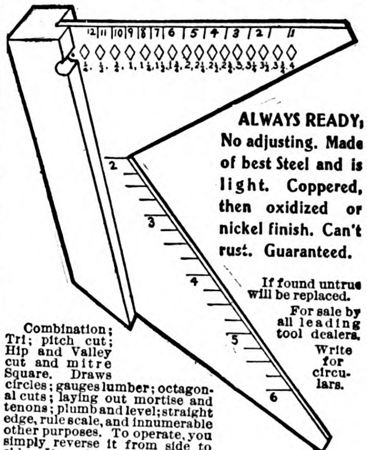
NICHOLLS MFG. CO., OTTUMWA, IOWA.

The New Universal Square

"NEW STYLE"

Made in Three Sizes:

No. 6—6 in. No. 10—10 in. No. 13—13 in.



ALWAYS READY, No adjusting. Made of best Steel and is light. Coppered, then oxidized or nickel finish. Can't rust. Guaranteed.

If found untrue will be replaced.

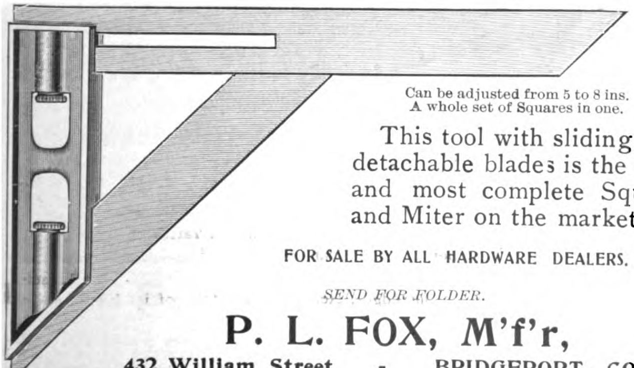
For sale by all leading tool dealers.

Write for circulars.

Combination; Tri; pitch cut; Hip and Valley cut and mitre Square. Draws circles; gauges lumber; octagonal cuts; laying out mortise and tenons; plumb and level; straight edge, rule scale, and innumerable other purposes. To operate, you simply reverse it from side to side. It marks ⅛ in. on one side and ¼ in. on the other.

THE DUBY & SHINN MFG. CO.,
INCORPORATED.
Office and Works, 34 E. 29th St., New York City.

THE FOX SQUARE AND MITER IMPROVED



Can be adjusted from 5 to 8 ins.
A whole set of Squares in one.

This tool with sliding and detachable blades is the best and most complete Square and Miter on the market.

FOR SALE BY ALL HARDWARE DEALERS.

SEND FOR FOLDER.

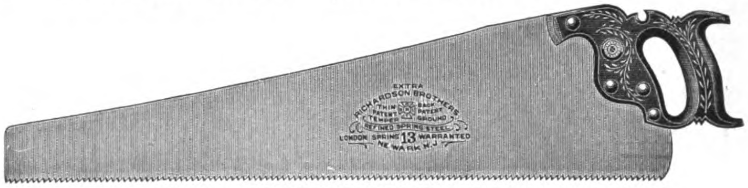
P. L. FOX, M'f'r,

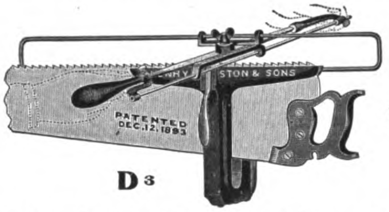
432 William Street - BRIDGEPORT, CONN.

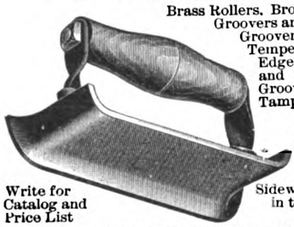
GRINDSTONES.

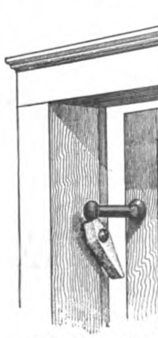
Mounted Grindstones for Carpenters' or Anybody's Use.

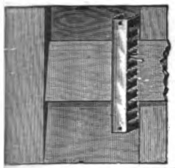
THE CLEVELAND STONE CO.,
6th Floor, Hickox Bldg. CLEVELAND, O.


EXTRA
RICHARDSON BROTHERS
THIN BACK
PATENT PATENT
TEMPER GROUND
REFINED SPRING STEEL
LONDON SPRING 13 WARRANTED
NEWARK N.J.


NHY
STON & SONS
PATENTED
DEC.12.1893
D3







NEW
CLAP-BOARD MARKER.
Cheaper and better than any on the market.

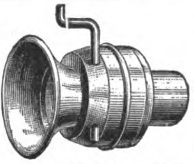
Countersink and Depth Gauge.

Send for circulars, or ask your Hardware Dealer for them.
OTIS A. SMITH, Rockfall, Conn.

SPRING PAINTING

Seasonable talk on Good Paint for the Preservation of all classes of Metal and Wood, is contained in the New Pamphlet B-32.
WRITE FOR A FREE COPY
PAINT DEPARTMENT
JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

W. R. OSTRANDER & CO., 22 Dey Street, New York City,
Manufacturers of
Speaking Tubes, Whistles, Elevator, House and Hotel Annunciators and Bells, Electric Light Supplies.
Send for Catalogue.
Factory, 1431-1439 DeKalb Avenue, Brooklyn.



"Yankee" Tools.

No. 11.—RATCHET, RIGHT AND LEFT HAND AND RIGID.

No 15—RATCHET, WITH FINGER TURN ON BLADE.

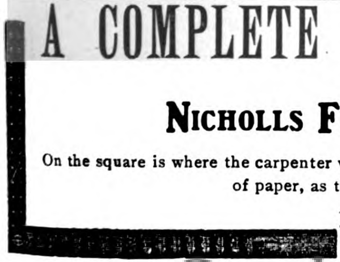
No. 30.—SPIRAL RATCHET, RIGHT AND LEFT HAND AND RIGID.

The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up to date mechanic could buy tools of their quality and character. Other tools are very good tools, but "Yankee" Tools are better. "Yankee" Tools are sold by all leading dealers in Tools and Hardware. Ask your dealer to see them. Our Yankee Tool Book tells all about them. Sent free by

NORTH BROS. MFG. CO., Philadelphia, Pa.

A TOOL THAT'S STAMPED
STANLEY
IS THE BEST OF IT'S KIND

IMPROVED CARPENTERS' TOOLS
Sold by all Hardware Dealers
Stanley Rule and Level Co.
NEW BRITAIN, CONN., U. S. A.



A COMPLETE FRAMING RULE
ON
NICHOLLS FRAMING SQUARE.

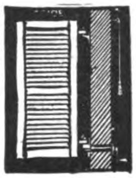
On the square is where the carpenter wants his figures, not in a book or on a piece of paper, as they are usually lost.

NICHOLLS MFG. CO.,
OTTUMWA, IOWA.

We have now ready our
New Illustrated Catalogue No. 19
devoted exclusively to
Wood Workers' Tools

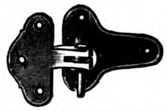
Containing **250** pages, **1100** illustrations, handsomely printed on good paper, it makes a convenient and valuable book for **all woodworking mechanics.**
Sent to any address on receipt of 10 cents postage.
WM. P. WALTER'S SONS,
TOOL HEADQUARTERS
1233 Market St., Philadelphia.

Mallory Shutter Worker.
Works and locks the blinds from the inside. Ornamental, durable, perfect working. Applicable to old or new buildings.
Manufactured by
MALLORY MFG. CO.,
Flemington, N. J.



Automatic Blind Hinges

HALE & BENJAMIN'S PATENT



Flush and surface for wood and brick building. Easy to put on, strong and durable. **Warranted.** Also combination awning hinges. With these hinges blinds will not slam or blow off. They are the only hinges adapted to bay or mullion windows, as they require no other fixtures. Testimonials on request from dealers, contractors, and people who have used them several years. We are the sole owners of these two patents. If your dealer does not keep them write to
PARKER WIRE GOODS COMPANY,
Manufacturers,
No. 1 Assonet Street, Worcester, Mass.

Use Our
Folding and Adjustable
Handle Draw Knife!

It is adjustable to any position, adaptable to the awkward places, absolutely rigid when set, handy and compact, a time saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.
Write for Prices and Discounts.
A. J. WILKINSON & CO.,
180-188 Washington St., Boston, Mass., U.S.A.

The Rich Handy Drawing Outfit
Saves Time
for the draughtsman, and is a great aid to the learner. It holds a number of sheets or a pad, which requires no fastenings. The Protractor T Square gives accurate angles. You get measurements direct from the board. Has a drawer for instruments, and can be carried around to make drawings on the spot Circulars free.
J. & G. RICH, 122 N. 6th St., Phila., Pa.

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Send for Catalogue No. 62

Giving description of books on Architecture, Building, Engineering and allied subjects. Sample of "Architects & Builders Magazine" sent on request.

Published monthly at $2.00 a year.
Foreign Subscriptions, $3.00 a year.

WM. T. COMSTOCK, Pub., 23 Warren Street, N.Y.

The Schools of New York

use our special cluster reflectors. The most practical fixture in existence for stores offices, hospitals, public and institutional buildings generally. Particulars on request

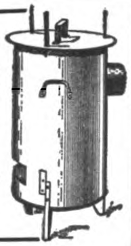
I. P. FRINK, 551 Pearl St., New York.

A 7½ HAND SAW

This is not a PRIZE but a JEWEL. If your dealer cannot furnish you one of our CELEBRATED NARROW A 7½ HAND SAW, 6 inch at butt, 1½ inch at point, 4 gauges thin on back, send us P. O. Order for $2.00 and we will send, express prepaid, 26 inch SAW in Canvas Scabbard.

C. E. JENNINGS & CO.,
101 Reade Street, NEW YORK.
SOLE MANUFACTURERS.

Plasterer's
DRYING STOVES



2 sizes
Send for price.

The S. M. Howes Co.,
40-46 Union St.
BOSTON, MASS.

STANDARD FOR 30 YEARS

This name stamped on every three feet is a guarantee that you are getting the best sash cord that can be made.

SILVER LAKE CO.,
Boston, Mass.

FREE 600 PAGE CATALOG

Over 20,000 labor saving, money saving articles for the shop, home or farm, fully illustrated, described and priced in our NEW 600 PAGE CATALOGUE No. 90. Also a larger variety of MECHANICS' TOOLS of all kinds at LOWER PRICES than heretofore shown in any catalogue ever published.

WHY NOT BUY AT WHOLESALE PRICES?

No mechanic should be without this valuable book. If you have not received our catalogue, write us to-day and it will be sent you FREE OF CHARGE

Send for our new PREMIUM LIST, containing 100 useful and valuable articles given away. Most wonderful offer ever made. SEND FOR IT TO-DAY.

FREIGHT RATES ARE LOWER FROM NEW YORK THAN ELSEWHERE. BUY IN NEW YORK

White, Van Glahn & Co.

Dealers in Reliable Merchandise Since 1816.

14 Chatham Square, New York City

OLDEST MAIL ORDER HOUSE IN AMERICA

TAINTOR
Positive Saw Set

TRY IT If you like it tell others
If you don't like it tell US

Send for our circular which contains HINTS on the

CARE of SAWS

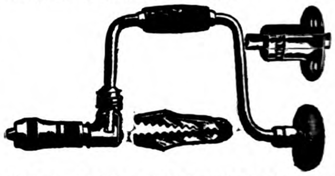
Free on application.

TAINTOR MFG. CO.
113 Chambers St., New York

Ask for **MILLERS FALLS CO.'S BIT BRACES**

Series Nos.	30	31	32	33
	14	12	10	8 inch sweep.

There are no other braces made which match them in merit and beauty of finish.



Our name appears on all genuine goods. Look for it before you buy. If your dealer does not keep Millers Falls Braces then write to us.

Millers Falls Company
28 Warren Street, New York, N. Y.

MONARCH Sash Chain

IS THE BEST.

Samples free. Mention this paper

The Bridgeport Chain Co.
Bridgeport, Conn.

SAMSON SPOT CORD

Distinguished by our trade-mark, the Colored Spot.

Outwears any other device for hanging windows.

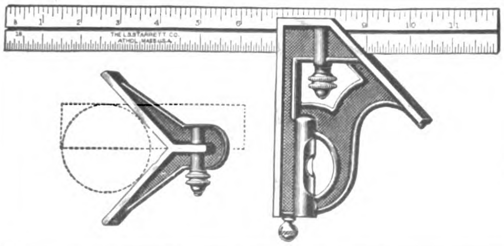
SAMSON CORDAGE WORKS, Boston, Mass.

THE FORD AUGER BIT

FORD AUGER BIT CO., Holyoke, Mass.

The first and only Bit with Patented Concave Twist. The best Bit for all round work yet produced. It is worth your time to try one and see.

BURLINGTON VENETIAN BLIND CO.
MAKERS OF
BLINDS
AND SCREENS
BURLINGTON, VT.



Starrett Combination Square

The Original
The much Imitated.

As necessary to a carpenter as a hammer.

Send for free Catalogue No. 17 P of the largest line of Fine Mechanical Tools made. . . .

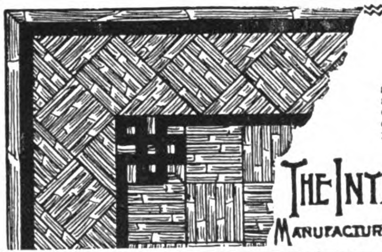
THE L. S. STARRETT CO., Athol, Mass., U. S. A.

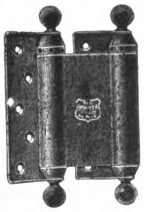
Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

VOL. XXVIII. NO. 7. NEW YORK, JULY, 1906. Ten Cents a Copy. One Dollar a Year.





Alphabetical List of Advertisers.

American Column Co.	72
American Rolling Mill Co.	11
American Wood Working Machinery Co.	6
Asphalt Ready Roofing Co.	1
Atkins, E. C. & Co.	82
Baker McMillen Co.	79
Barnes, W. F. & John Co.	4
Barnes Tool Co.	9
Barnett, G. & H., Co.	1
Batavia Clamp Co.	77
Berger Mfg. Co.	10
Bommer Bros.	1
Boston Bolt Co.	11
Bostrom-Brady Mfg. Co.	77
Boynton Furnace Co.	18
Bradt Pub. Co.	17
Bridgeport Chain Co.	84
Broad Gauge Iron Stall Wks.	77
Burlington Venetian Blind Co.	84
Burritt, A. W. Co.	73
Burt Mfg. Co.	16
Cabot, Samuel	1
Caldwell Mfg. Co.	75
Canton Steel Roofing Co.	15
Cement Machinery Co.	9
Chattanooga Roofing & Fdy. Co.	67
Chicago Machinery Exchange	6
Chicago Metal Covering Co.	74
Cincinnati Tool Co.	80
Cleveland Stone Co.	75
Columbia Mineral Wool Co.	18
Comstock, Wm. T.	84
Cordesman, Meyer & Co.	10
Cordesman-Rechtin Co.	10
Cortright Metal Rfg. Co.	13
Crescent Machine Co.	9
Danforth, A. H.	10
Davis & Cook	79
Diamond Expansion Bolt Co	9
Dieckman, F.	15
Disston, Henry & Sons	82
Dixon, Jos., Crucible Co.	83
Drouve, G. Co.	15
Eastern Granite Roofing Co.	14
Edwards Mfg. Co.	10
Eller Mfg. Co.	14
Energy Elevator Co.	17
Enterprise Fdry. Co.	7
Fay, J. A. & Egan Co.	5
Floyd, Wells Co.	77
Ford Auger Bit Co.	84
Forest City Bit & Tool Co.	75
Foster Munger Co	74
Fox Machine Co.	10
Fox, P. L.	81
French, Samuel H. & Co.	16
Frink, I. P.	84
Gage Tool Co.	18
Globe Ventilator Co.	16
Goodell Mfg. Co.	79
Grand Rapids Hdw. Co.	74
Grand Rapids Wood Carving Co.	75
Hamlin, George R.	11
Hammacher, Schlemmer & Co.	78
Hartmann Bros. Mfg. Co.	75
Hess Warming & Ventilating Co.	77
Hight, A. W.	80
Hitchings Co.	67
House Hints Pub. Co.	17
Howes, S. M., Co.	84
Hurley Machine Co.	3
Ideal Concrete Machinery Co.	7
Interior Hardwood Co.	1
International Cor. Schools	9
International Heater Co.	77
Ives, Hobart B. & Co.	76
Jennings, C. E. Co.	84
Johnson, E. J., Co	14
Kauneberg Rfg. & Ceil. Co.	11
Karol, B. C.	13
Kees, F. D. Mfg. Co.	76
Keighley, S. Metal Ceiling & Mfg Co.	13
Kilder, R. E.	15
Kimball Bros. Co.	17
King Mfg. Co.	75
Kinnear & Gager Co.	11
Kraeuter & Co.	80
Lane Bros. Co.	75
Leavitt Machine Co.	79
Lestershire Lumber & Box Co	16
Long Island Machinery Co.	5
Lord & Burnham Co.	67
Lorenzen, Chas. F. & Co.	73
Mallory Mfg. Co.	83
Marston, J. M. & Co.	5
Mesker & Bro.	15
Meyers, F J. Mfg. Co.	16
Miller, A. W., Mfg. Co.	18
Millers Falls Co.	84
Montross Metal Shingle Co.	14
Morse, Williams & Co.	17
Morton, Thomas	74
Mullins, W. H. Co	13
National Mfg. Co.	75
National Roofing Co.	13
National Saw Co.	82
Nat'l Sheet Metal Rfg. Co.	14
New Jersey Zinc Co.	14
N. Y. Steel Corner Plate Co.	17
N. Y. Telephone Co.	15
Nicholls Mfg. Co.	81&83
North Bros. Mfg. Co.	83
O. K. Harry Steel Wks.	5
Ostendorf, W. H.	75
Ostrander, W. R. & Co.	83
Parker Wire Goods Co.	83
Parks Ball Bearing Machinery Co.	5
Peerless Brick Mch. Co.	6
Pettyjohn Co.	7
Phila. & Boston Face Brick Co.	18
Pike Mfg. Co.	1
Progressive Mfg. Co.	78
Reed & Auerbacher Co.	18
Rehm Hardware Co.	79
Rich, J. & G.	83
Richards Mfg. Co.	76
Sackmann, F. A.	5
Samson Cordage Works	84
Schaller-Hoerr Co.	72
Scott & Co.	11
Sedgwick Mch. Works	17
Seneca Falls Mfg. Co.	4
Shimer, Samuel J. & Sons	9
Silver Lake Co.	84
Simonds Mfg Co.	18
Smith, Otis A.	83
Smith & Egge Mfg. Co.	79
Standard Paint Co.	12
Stanley Rule & Level Co.	83
Stanley Works	1
Star Encaustic Tile Co.	14
Starrett, L. S. Co.	1&84
Stowell Mfg. Co.	12
Strelinger, C. A. Co.	81
Taintor Mfg. Co.	84
Topp, G. A. & Co.	12
Tower & Lyon	78
Truss Metal Lath Co	16
Tubular Heating & Ventilating Co	77
Union Mfg. Co.	80
U. S. Mineral Wool Co.	18
Van Dorn Iron Wks. Co.	5
Waddell Mfg. Co.	74
Walters, Wm. P. Sons	88
Warner Elevator Mfg. Co.	17
Washburne, E. G. & Co.	9
Wheeling Corrugating Co.	12
White, Van Glahn & Co.	84
Wilkinson, A. J. & Co.	88
Willis Mfg. Co.	13
Woodhouse Hdw. Mfg. Co.	75
Wood-Mosaic Flooring Co.	18
Yale & Towne Mfg. Co.	76

Classified List of Advertisers.

Annunciators
Ostrander, W. R. & Co.

Architects' Blue Prints

Architects' Details
Lestershire Lumber & Box Co.

Asbestos
Stowell Mfg. Co.

Auger Bits
Ford Auger Bit Co.
Jennings, C. E. Co.

Awnings
Chattanooga Roofing & Fdry. Co.
O. K. Harry Steel Works

Band Saws
American Wood Working Machinery Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Crescent Machine Co.
Fay, J. A. & Egan Co.

Barrel Swings
Leavitt Machine Co.

Blackboards, Slate
Johnson, E. J. Co.

Blinds
Burlington Venetian Blind Co.
Foster-Munger Co.
Schaller-Hoerr Co.

Blind Hinges
Parker Wire Goods Co.
Stanley Works

Bolts and Nuts
Boston Bolt Co.

Books
Arthur, Wm.
Bradt Pub. Co.
Comstock, Wm. T.
House Hints Pub. Co.
Williams, David, Co.

Boring Machines
Fox Machine Co.
Millers Falls Co.

Brackets, Building, Folding
Danforth, A. H.

Brick Machinery
Cement Machinery Co.
Peerless Brick Machine Co.

Builders' Hardware
Boston Bolt Co.
Hammacher, Schlemmer & Co.
Rehm Hardware Co.
Yale & Towne Mfg. Co.

Building Brackets, Folding
Danforth, A. H.
Stanley Works
Tower & Lyon Co.

Building Material
Lestershire Lumber & Box Co.

Building Paper and Felt
Cabot, Samuel.
Standard Paint Co.

Builders' Supplies
Schaller-Hoerr Co.

Butts and Hinges
Stanley Works.

Capitals
Grand Rapids Wood Carving Co.
Waddell Mfg. Co.

Ceiling, Metallic
Berger Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Keighley, S. Metal Ceiling & Mfg. Co.
Kinnear & Gager Co.
Wheeling Corrugating Co.
Willis Mfg. Co.

Cement
French, S. H. & Co.

Cisterns, Steel
O. K. Harry Steel Works.

Clamps
Batavia Clamp Co.
Cincinnati Tool Co.

Concrete Block Machines
Cement Machinery Co.
Enterprise Fdry. Co.
Ideal Concrete Machinery Co.
Peerless Brick Machine Co.
Pettyjohn Co.

Conductor Pipe and Elbows
Dieckmann, F.

Conductor Pipes
American Rolling Mill.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.

Conductor Shoes
Dieckmann F.

Conservatories
Lord & Burnham Co.

Contractors' Supplies
Boston Bolt Co.

Cornices, Sheet Metal
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mesker & Bro.
Mullins, W. H. Co.
Willis Mfg. Co.

Coverings, Metal
Chicago Metal Covering Co.

Cresting
Van Dorn Iron Works Co.
Willis Mfg. Co.

Cutter Heads
Shimer, Sam'l J. & Sons.

Designs and Details
(See House Plans)

Door Checks and Springs
Hammacher, Schlemmer & Co.

Door Checks, Screen
Caldwell Mfg. Co.

Door Hangers
Lane Bros. Co.
National Mfg. Co.

Draw Knives
Wilkinson, A. J. & Co.

Drawing Instruction
International Correspondence Schools.

Drawing Outfits
Comstock, Wm. T.
Rich, J. & G.

Drying Stoves
Drouve, G. Co.
Howes, S. M. Co.

Dumb Waiter Fixtures
Hammacher, Schlemmer & Co.

Eave Troughs
Chattanooga Roofing & Fdry. Co.
Eller Mfg. Co.
Wheeling Corrugating Co.

Elevators and Dumb Waiters
Energy Elevator Co.
Kimball Bros. Co.
Meyers, F. J. Mfg. Co.
Morse, Williams & Co.
Sedgwick Machine Works.
Warner Elevator Mfg. Co.

Etching Fluid
Reed & Auerbacher Co.

Exhaust Heads
Burt Mfg. Co.

Expansion Bolts
Boston Bolt Co.
Diamond Expansion Bolt Co.

Fencing
O. K. Harry Steel Works.

Files and Rasps
Barnet, G. & H. Co.
Boston Bolt Co:

Floor Scrapers
Hurley Machine Co.

Framing Tools
Topp, G. A., & Co.

Furnaces and Heaters
Boynton Furnace Co.
Floyd-Wells Co.
Hess Warming & Ventilating Co.
International Heater Co.
Tubular Heating & Ventilating Co.

Gas and Electric Fixtures
Frink, I. P.

Grates, Fancy Plated
Chattanooga Roofing & Fdry. Co.

Greenhouses
Hitchings & Co.
Lord & Burnham Co.

Grille Work, Wood
Foster-Munger Co.
Waddell Mfg. Co.

Grindstones
Cleveland Stone Co.
Richards Mfg. Co.

Grooving Heads
Fox Machine Co.

Hangers, Barn Door
Richards Mfg. Co.

Hangers, House Door
Richards Mfg. Co.

Hardware Jobbers
White, Van Glahn & Co.

Hardware Specialties
Richards Mfg. Co.

Hasps, Hooks and Staples
Woodhouse Hdw. Mfg. Co.

Heaters.—*Steam and Hot Water.*
International Heater Co.
Lord & Burnham Co.

Hinges, Spring
Bommer Bros.

Hinges, Window Screen
Kees, F. D. Mfg. Co.

House Plans
Comstock, Wm. T.

Iron House Fronts
Mesker & Bro.

Iron Work
Van Dorn Iron Works Co.

Lath, Metal
Truss Metal Lath Co.
Wheeling Corrugating Co.

Levels
Baker, McMillen Co.
Bostrom-Brady Mfg. Co.
Davis & Cook.

Lightning Rods
Washburn, E. G. & Co.

Locks
Rehm Hardware Co.
Yale & Towne Mfg. Co.

Lumber and Shingles
Lestershire Lumber & Box Co.

Mangers, Slow Feed
Broad Gauge Iron Stall Works.

Mantels
Burritt, A. W., Co.
Foster-Munger Co.
French, Sam'l H. & Co.
Lorenzen, C. F. & Co.
Ostendorf, W. H.
Phila. & Boston Face Brick Co.

Masons' Stoves
Drouve, G. Co.

Metal Covering
Chicago Metal Covering Co.

Metal Lath
Truss Metal Lath Co.

Mill Work
Schaller-Hoerr Co.

Mineral Wool
Columbia Mineral Wool Co.
U. S. Mineral Wool Co.

Miter Boxes
Goodell Mfg. Co.
Nicholls Mfg. Co.

Miter Machines
Fox Machine Co.

Miters
Fox, P. L.

Moldings
American Column Co.
Grand Rapids Wood Carving Co.
Schaller-Hoerr Co.
Waddell Mfg. Co.

Moldings, Wood, Metal Covered
Chicago Metal Covering Co.

Mortar Colors
French, Sam'l H. & Co.

Mortisers, Hand
Miller, Albert W., Mfg. Co.

Oil Filters
Burt Mfg. Co.

Ornamental Sheet Metal Work
Mullins, W. H. Co.

Ornamental Wire, Iron, Steel and Brass Work
Meyers, F. J. Mfg. Co.

Paint
New Jersey Zinc Co.
Standard Paint Co.

Parquette Flooring
Interior Hardwood Co.
Wood-Mosaic Flooring Co.

Patent Lawyers
Hamlin, George R.

Pencils
Dixon, Jos. Crucible Co.

Planes
Gage Tool Co.
Smith, Otis A.
Tower & Lyon Co.
Union Mfg. Co.

Plasterers' Corner Plates
New York Steel Corner Plate. Co.

Plastic Ornaments
French, Samuel H. & Co.

Plumbers' Supplies
Karol, B. C.

Porch Columns
American Column Co.
Hartman Bros. Mfg. Co.

Post and Mining Machinery
Cement Machinery Co.

Reflectors
Frink, I. P.

Roofing, Art Metal Tile
Mullins, W. H. Co.

Roofing and Siding
Asphalt Ready Roofing Co.
Berger Mfg. Co.
Canton Steel Roofing Co.
Drouve, G. Co.
Eastern Granite Roofing Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Lincoln Waterproof Cloth Co.
National Roofing Co.
O. K. Harry Steel Works.
Scott & Co.
Standard Paint Co.
Stowell Mfg. Co.
Wheeling Corrugating Co.

Roofing Brackets
Stanley Rule & Level Co.

Roofing Paint
Asphalt Ready Roofing Co.
Dixon, Jos. Crucible Co.

Roofing Slate
Johnson, E. J. Co.

Sash Balances
Caldwell Mfg. Co.

Sash Chains
Bridgeport Chain Co.
Morton, Thomas.
Smith & Egge Mfg. Co.

Sash Cord
Samson Cordage Works.
Silver Lake Co.

Sash Locks
Ives, H. B. & Co.

Sash Operating Devices
Hitchings & Co.
Lord & Burnham Co.

Sash Pulleys
Grand Rapids Hardware Co.

Sashes, Doors and Blinds
Foster-Munger Co.
Lestershire Lumber & Box Co.

Saw Clamps
Disston, Henry & Sons.

Saw Filing Guide
Disston, Henry & Sons.

Saw Jointers
Crescent Machine Co.

Saw Sets
Taintor Mfg. Co.

Saw Tables
Chicago Machinery Exchange.
Crescent Machine Co.
Kidder, R. E.

Saws
Atkins, E. C. & Co.
Disston, Henry & Sons.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
National Saw Co.
Simonds Mfg. Co.

Schools
International Correspondence Schools.

Screw Drivers
Kraeuter & Co.
North Bros. Mfg. Co.

Sheet Metal Fronts
Mesker & Bro.

Shingles and Tiles, Metallic
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Cortright Metal Roofing Co.
Montross Metal Shingle Co.
National Sheet Metal Roofing Co.
Willis Mfg. Co.

Shingles Hip
Wheeling Corrugating Co.

Shingle Stains
Cabot, Samuel.

Shutter Worker
Mallory Mfg. Co.

Shutters (See Blinds)

Skylights
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Drouve, G. Co.
Edwards Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mullins, W. H. Co.
Willis Mfg. Co.

Speaking Tubes
Ostrander, W. R. & Co.

Spring Hinges
Bommer Bros.

Squares
Fox, P. L.
Nicholls Mfg. Co.

Squares, Combination
Hight, A. W., Toledo, O.

Steel Figures and Letters
Sackman, F. A.

Stoves and Ranges
Boynton Furnace Co.

Structural Iron and Steel Works
Boston Bolt Co.

Structural Slate
Johnson, E. J. Co.

Tanks, Steel
O. K. Harry Steel Works

Telephones
New York Telephone Co.

Tiling
Ostendorf, W. H.
Star Encaustic Tile Co.

Tool Boxes
Walter's Sons, W. P.

Tool Cabinets
Hammacher, Schlemmer & Co

Tool Chests
Jennings, C. E. Co.

Tools
Forest City Bit & Tool Co.
Gage Tool Co.
Hammacher, Schlemmer & Co
Jennings, C. E. Co.
Kraeuter & Co.
Millers Falls Co.
North Bros. Mfg. Co.
Progressive Mfg. Co.
Reed & Auerbacher Co.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S., Co.
Strelinger, C. A., Co.
Tower & Lyon Co.
Walter's Sons, Wm. P.
Wilkinson, A. J., & Co.

Turned, Molded Carved Work
Waddell Mfg. Co.

Ventilating Attachment
Drouve, G., Co.

Ventilators
Burt Mfg. Co.
Globe Ventilator Co.

Veranda Stock
American Column Co.

Vises
Hammacher, Schlemmer & Co

Wagon Jacks
Batavia Clamp Co.

Weather Strips
Hammacher, Schlemmer & Co
King Mfg. Co.

Weather Vanes
Broad Gauge Iron Stall Works.

Window Apparatus
Drouve, G. Co.

Window and Door Stops
King Mfg. Co.

Window Fasteners
Stanley Works.

Window Stop Adjusters
Ives, Hobart B., & Co.

Window Trimmings
Caldwell Mfg. Co.

Windows, Fireproof
Mullins, W. H. Co.

Wood Carving
Grand Rapids Wood Carving Co.

Wood Mantels
(See Mantels)

Wood Ornaments
Waddell Mfg. Co.

Wood Trimmers
Fox Machine Co.

Wood Working
Lestershire Lumber & Box Co.

Wood Working Machinery
American Wood Working Mach'y Co.
Barnes, W. F. & John.
Barnes Tool Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Cordesman-Rectin Co.
Fay, J. A. & Egan Co.
Fox Machine Co.
Kidder, R. E.
Long Island Machinery Co.
Marston, J. M. & Co.
Parks Ball Bearing Machinery Co.
Seneca Falls Mfg. Co.

Wood Working Machinery, Second Hand
Long Island Machinery Co.

See My Finish!

Send for
our Circulars.

Watch it spread over millions of feet of flooring— all kinds, from the finest "parquet" to the heaviest — wherever progressive builders appreciate that the old "marrow-bones and elbow grease" method of *yesterday*, can't class with the method of *to-day*.

That I do the work *better, faster* and *cheaper* than any other known method, is the opinion of those who know by experience.

This one letter

NEW YORK
BOSTON
BALTIMORE
PHILADELPHIA
PITTSBURG
WASHINGTON
ST LOUIS

Bank

George A. Fuller Company
Building Construction
Marquette Building
Chicago

WILLIAM A. MERRIMAN
VICE PRESIDENT & WESTERN MANAGER

April 30, 1906.

Hurley Machine Co.,
153 S. Jefferson St,
Chicago - Ill.

Dear Sirs:

Enclosed please find our check for $260.00, in payment for four of your "Little Giant Floor Scrapers." We have used them in the American Trust & Savings Bank Building. Not only have they done the work well, but they have done it economically. They have saved us time, and money, and justified all your claims for the machine.

Yours very truly,
GEORGE A. FULLER COMPANY.
Vice President.

is like hundreds

YESTERDAY

Price complete
f. o. b.
Chicago
or
New York
$65.00

TO-DAY

The "LITTLE GIANT" Floor Scraper

Is a man power machine, the unit of simplicity in construction, and the acme of perfection in performance. Adaptable to any kind or style of floor scraping Easily operated by any one of your men, who can, in a very short time, be finishing 1000 sq. ft. a day. Does it sound too big? Let us show you— it's up to us and we want to do it.

Hurley Machine Co.

153 to 159 South Jefferson St.
CHICAGO, U. S. A.
N. Y. Office, 1010 Flat Iron Bldg.

FOOT, HAND AND POWER

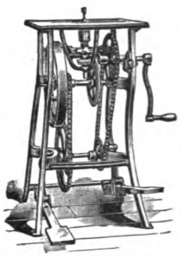
WOOD-WORKING MACHINERY

For Carpenters, Builders, Cabinet-Makers and Other Wood-Workers.

Built for Hard Work, Accurate Work and Long Service.

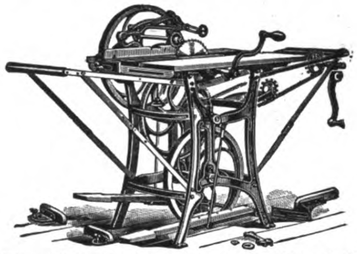
"Victor" Scroll Saw.

"Diamond" Mortiser.



"Rex" Moulder.

ONE MAN with one of these machines will do the work of four to six men using hand tools; will do it easier, will do it better.



No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw.

WE GUARANTEE each machine to be thoroughly practical and accurate. Machines sent on trial, and if not found entirely satisfactory may be returned at our expense.

No. 8 "Union" Power Saw.

Enterprising mechanics are quick to see the superior merits of our machines. It will pay you to investigate these advantages.

SEND FOR CATALOG "A."

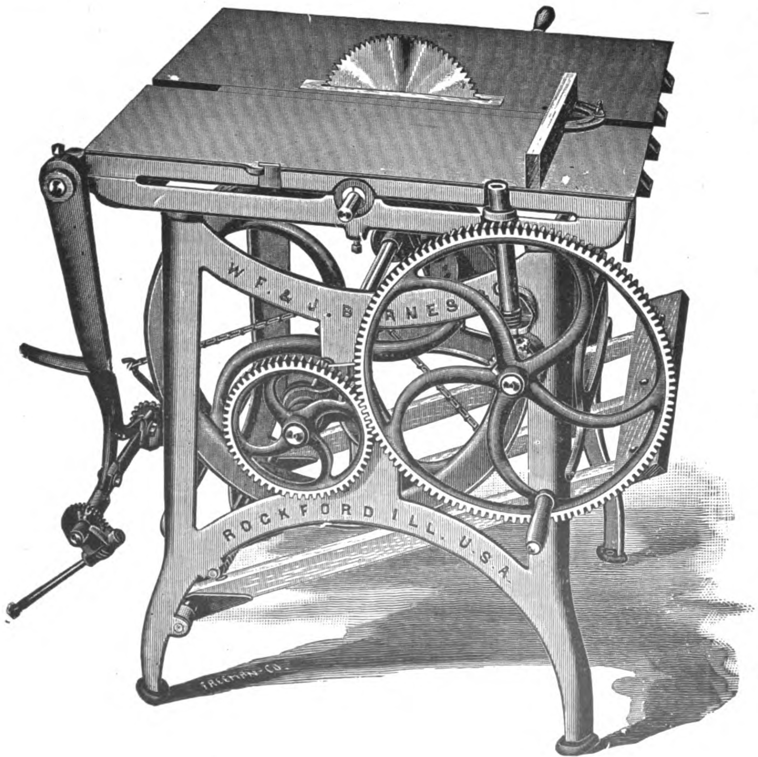
The Seneca Falls Manufacturing Co.

209 Water Street, Seneca Falls, N. Y., U. S. A.

(96)

No. 6 "Union" Combination Saw.

Barnes Foot and Hand Power Machinery



For

CARPENTERS and BUILDERS.

Our New Hand and Foot Power Circular Saw No. 4, the strongest most powerful, and in every way the best machine of its kind ever made for ripping, cross cutting and for grooving, gaining, dadoing and rabbeting. Solid iron table planed perfectly true.

We make nine other machines for Wood Workers.

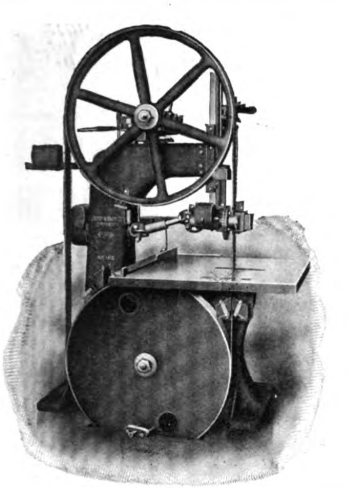
The Only Complete Line of Such Machines made.

Strong,
Practical,
Durable.

Catalogue Free on Application.

W. F. & JOHN BARNES CO.

71 Ruby St., Rockford, Ill.



NEW BAND RIP SAW

THIS machine takes the place of our famous No. 1 Saw and is therefore still better. Notice the heavy upright column and the general appearance of solidity throughout.

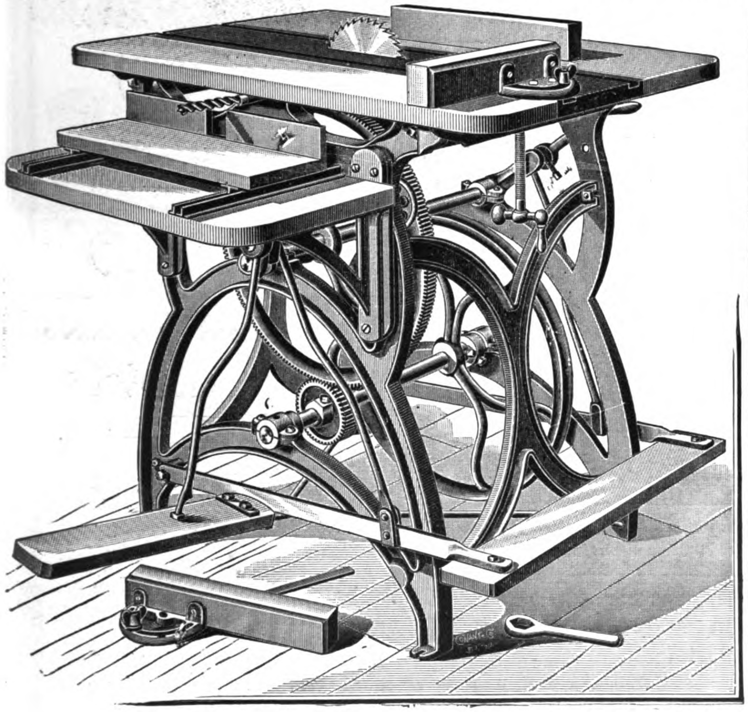
Every modern improvement in band saw construction is embodied in this tool and it is able to do the most, best and most economical work, and stand up to the wear and tear of continuous service.

Takes 24 inches between saw and fence and 12 inches under the guide. Circulars give all details and large illustrations of both sides of the machine.

Complete Information and Catalogue Free.

J.A. FAY & EGAN CO.
221-241 W. Front St. CINCINNATI, O.
The World's Standard for Woodworking Machinery

Marston's Hand and Foot Power Circular Saw.



Iron frame, 36 inches high.

Center part of top is made of iron accurately planed, with grooves on each side of saw for gauges to slide in.

Steel shafts and best babbitt metal boxes.

Gears are all machine-cut from solid iron.

Boring table and side treadle.

Two 7-inch saws and two crank handles with each machine.

Weight complete, 350 pounds.

Send for catalogue.

J. M. MARSTON & CO., 201 Ruggles St., Boston, Mass.

VAN DORN IRON WORKS CO

CLEVELAND, OHIO.
STRUCTURAL STEEL & ORNAMENTAL IRON WORK.
JAIL WORK. JOIST HANGERS. IRON FENCINGS.

SECOND-HAND WOOD WORKING MACHINERY

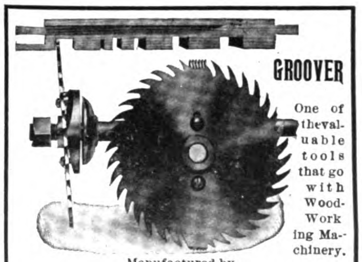
Woods Moulder 12 in.	Matchers 24 in.
Berlin Moulder 15 in.	Pony Planers 16, 20, 24 in.
Rogers Moulder 8 in.	

Variety Machines, Double and Single, Jointers, Swing Saws, Rolling Top Saw Tables, Gas and Gasoline Engines, Band Saws, Routers, Sanders, Circular Saws, Jig Saws.

A1 CONDITION. PROMPT DELIVERY.

All Kinds of Machinery Purchased for Cash.

LONG ISLAND MACHINERY CO.
15 Washington Ave., Brooklyn, N. Y.



GROOVER

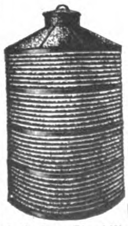
One of the valuable tools that go with Wood-Work ing Machinery.

Manufactured by
Parks Ball Bearing Machine Co.
Sta. A, CINCINNATI, OHIO.

MARK YOUR TOOLS WITH A STEEL STAMP.

F. A. SACKMANN.
61 PROSPECT ST.
CLEVELAND, OHIO.

SEND FOR PRICE-LIST No. 7



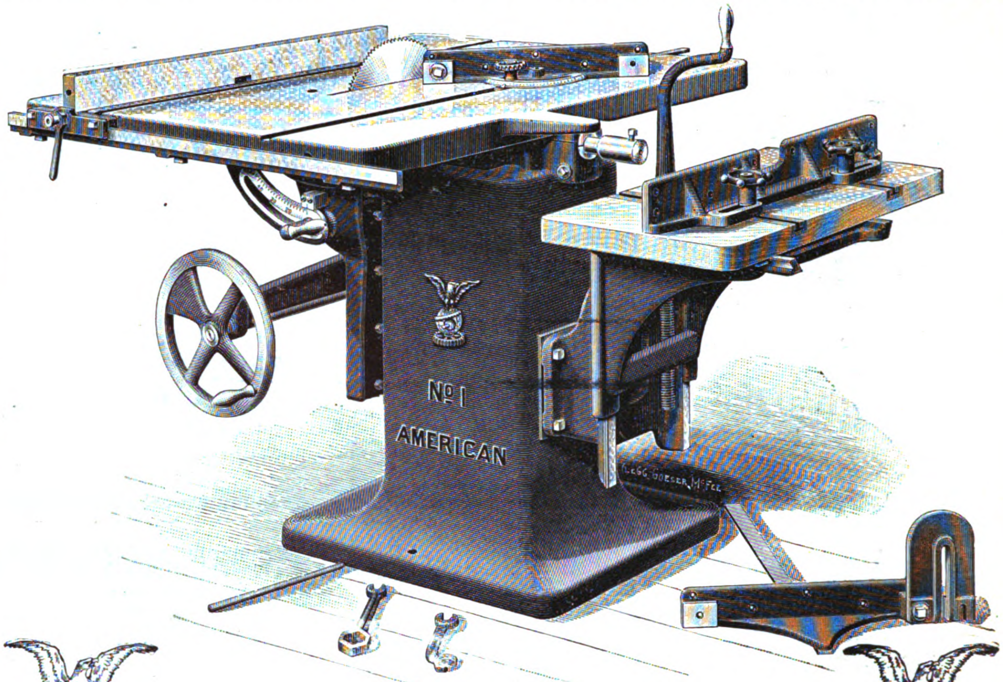
Harry's Patent Adjustable Steel Drop Awnings.

Harry's Underground Corrugated Galvanized Steel Cisterns and Tanks

Roofing of all kinds, Fencing, etc
Send for catalogue, prices, etc.

O.K. Harry Steel Works, 2341 Papin St., St. Louis, Mo.

American No. 1 Clement Variety Saw Bench, with Boring Attachment·



AMERICAN
WOOD WORKING MACHINERY
COMPANY

New Orleans, Chicago, New York

WOOD WORKING MACHINERY

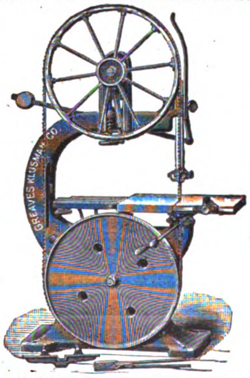
FOR

Carpenters and Builders

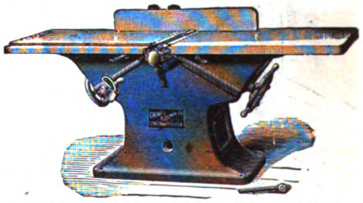
Don't fail to visit our exhibit when in Chicago. Machinery of all descriptions for your inspection.

UP TO DATE MACHINERY
For the Progressive Carpenter

Write for prices on rebuilt
MACHINERY



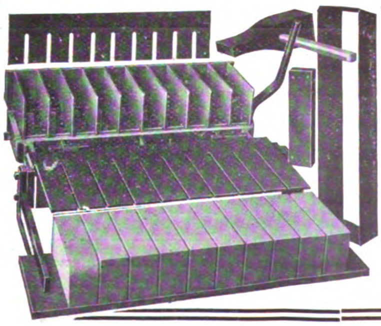
NEW PATENT 36-INCH BAND SAWING MACHINE.



IMPROVED HAND PLANER AND JOINTER.

Tables over 7 feet long and have steel lips.
Cylinder Slotted to receive moulding bits and other irregular knives.
Cylinder has three Bearings, one of which is outside of pulley.

CHICAGO MACHINERY EXCHANGE, 13-15 No. Canal St., CHICAGO, ILL.



The Peerless Cement Brick Machine

A Simple One Man Machine made of Iron and Steel. Producing 10 perfect face or common brick at a time. Capacity, 3000 or more per day. Price Right. Send for Catalogue.

Peerless Brick Machine Co.,
10 Sixth St. North, Minneapolis, Minn.

YOU WANT THE BEST

HERE ARE A FEW CONVINCING REASONS IN FAVOR OF "IDEAL"

SIMPLICITY: The "Ideal" has face plate in the bottom of the mould. Cores are moved horizontally by positive lever motion. No gears, no cogs, no wheels, no cranks, no chains, nothing to break or get out of order. You tamp on the face in the "Ideal" mould.

DURABILITY: The "Ideal" block machine is built of the best grey iron castings and polished cold rolled steel shaftings. In no part is strength sacrificed. All parts are perfectly machined and assembled. Will last a lifetime. Examine the picture.

ADAPTABILITY: The "Ideal" is a machine adaptable to any emergency or situation that may arise in the building line. The diversity of design is almost unlimited. The machine is interchangeable to four, eight, ten and twelve inch widths. It is adjustable to sixteen lengths.

RAPIDITY: Upon the rapidity of a block machine depends in great part the profit on a contract. Speed is imperative. So rapidly is this machine gotten ready for making and discharging blocks that it becomes simply a matter of human endurance as to number of blocks turned out.

SEND FOR CATALOG "A."

IDEAL CONCRETE MACHINERY COMPANY

STATION 21, SOUTH BEND, INDIANA.

"ON THE HIGH WAVE TO POPULARITY."

Portable Hollow Concrete Block Machine

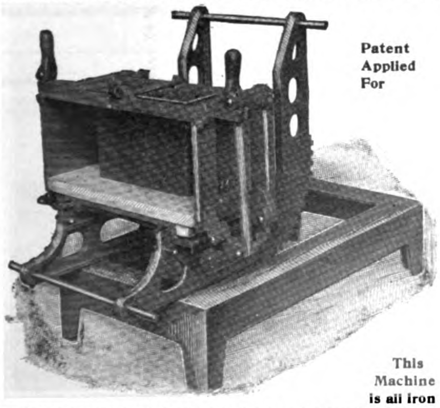
BEST—FASTEST—SIMPLEST—CHEAPEST.

MOVE THE MACHINE—NOT THE BLOCKS

Saves labor of off-bearing, avoids loss by crackage or breakage, saves expense of heavy cumbersome iron pallets. Sand, Water and Portland Cement only materials required. BIG PROFITS. Blocks cost 6 cents to make. Sell for 18 cents. Whole outfit costs $125.00.

FULLY GUARANTEED. SENT ON TRIAL.

THE PETTYJOHN CO., 616 North 6th Street,
TERRE HAUTE, IND.



Patent Applied For

This Machine is all iron

The Perfection Cement Block Machine

MAKES THE BEST HOLLOW CEMENT BLOCKS OF ANY MACHINE ON THE MARKET. It Tamps on the Face, an Important Fact to Consider when Purchasing a Cement Block Machine

Outfits from $50.00 up

This machine has reached the height of **Perfection in Simplicity, Durability and Quickness**

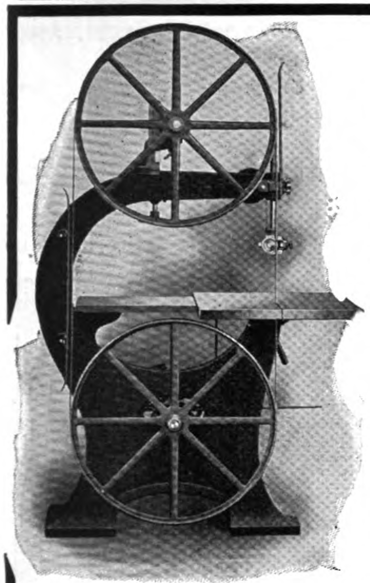
DON'T DELAY! DON'T HESITATE!

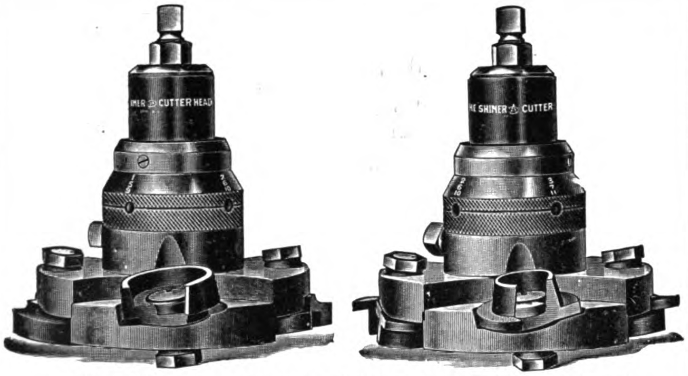
Send for our Descriptive Circular and Prices.

MANUFACTURED BY

ENTERPRISE FOUNDRY COMPANY

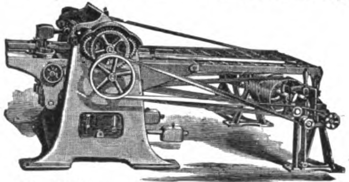
Office and Works: 83 OLEAN STREET ROCHESTER, N. Y.



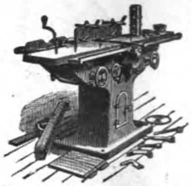

SHIMER CUTTER HEAD
THE SHIMER CUTTER


DIAMOND
EXPANSION SHIELD

CORDESMAN, MEYER & CO., 26, 28 and 30 Central Avenue
CINCINNATI, OHIO.
Manufacturers of Latest Improved
Wood-Working Machinery



No. 2 Planer, Matcher and Moulder.



Universal Wood-Worker.

FOX

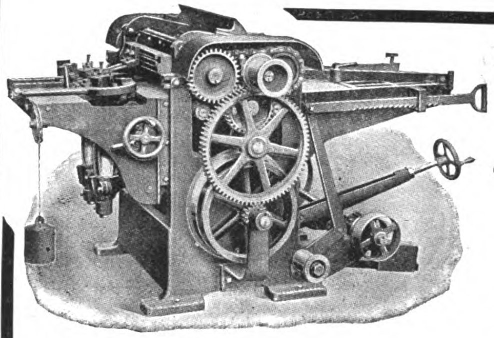
Adjustable Saw Dado Heads
The best thing for cutting grooves.

Fox Foot Power Miter Machines
The best thing for mitering mouldings and similar work.

We also make
Universal Trimmers,
Boring Machines, Lathes,
Planers, etc.

FOX MACHINE CO.
387 N. Front St., Grand Rapids, Mich

We Want Good Agents Everywhere
To Handle and Sell
The Edwards Metal Ceilings
Write for Special Proposition
The Edwards Manufacturing Co.,
"The Sheet Metal Folks"
Manufacturers of the most extensive line of Sheet Metal Building Material in the world.
Main Office & Works: 423 to 443 Eggleston Avenue,
CINCINNATI, OHIO.
Metal Ceiling Catalog H. Sheet Metal Catalog L.
Free upon request



SOLID FACTS
CONCERNING OUR LATEST
No. 21 "INNOVATION" PLANER MATCHER AND MOULDER.

A positive feed medium weight, convenient tool! Insuring a perfectly finished product. Requires little room and power.

Cylinder made of crucible steel, for two belts; all rolls driven; two speeds of feed and a binder to instantly stop and start same.

A SPECIAL FEED MECHANISM MADE OF STEEL FRICTIONLESS ROLLER LINK CHAIN, insures DURABILITY and SIMPLICITY, besides ELIMINATING MANY GEARS AND STUDS.

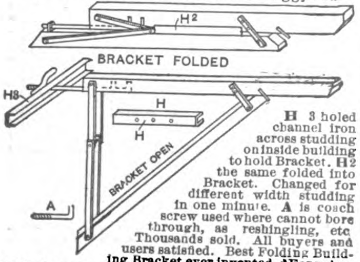
Spring and Crown Moulds can be made in one operation, a feat possible with but few if any similar machines.

Planes up to 26 in. wide and 8 in. thick. Matches up to 14 in. wide and 2 in. thick.

Possesses many other valuable features peculiar to itself. Ask for full particulars.

The Cordesman-Rechtin Company
Dept. "B" Butler St., CINCINNATI, OHIO

FOLDING BUILDING BRACKET (Patented)
One Dozen Carried Under Concord Buggy Seat



H 3 holed channel iron across studding on inside building to hold Bracket. **H2** the same folded into Bracket. Changed for different width studding in one minute. **A** is coach screw used where cannot bore through, as reshingling, etc. Thousands sold. All buyers and users satisfied. Best Folding Building Bracket ever invented. For price, particulars, etc., write **A. H. Danforth, Monson, Mass.**

We make Ceilings for churches, schools, stores, lodge rooms, court rooms, libraries, residences, etc.

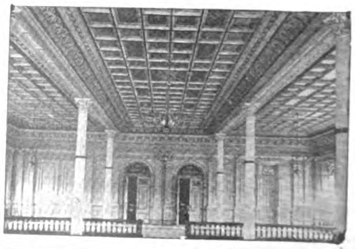
Our ceilings are shipped ready for erection. No expert labor required. Working drawings furnished. They're adapted to any kind of building. Exclusive in classified design.

Berger "CLASSIK"
Steel Ceilings

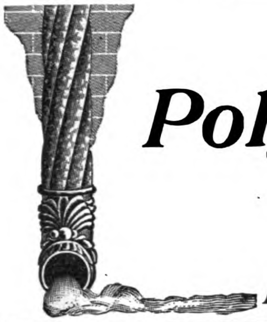
We also make Steel Roofing, Siding, Metal Shingles, Architectural Sheet Metal Work and Fireproofing Material.

Our catalogues sent you free. Ask for them.

THE BERGER MFG. CO.
CANTON, OHIO.
New York. Boston. Phila. St. Louis



Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google



"AMERICAN"
Polygon Conductor Pipe

Can be furnished in either Galvanized Iron or Copper. It is made from galvanized iron in 10-ft. lengths, without a cross seam; from copper in 8-ft. lengths.

American Rolling Mill Co., MIDDLETOWN, OHIO.

ARCHITECTS! CONTRACTORS! BUILDERS!

When you want any STRUCTURAL WORK it will pay you to write to the

BOSTON BOLT COMPANY
ESTABLISHED 1872

Works, Offices and Salesroom
38-54 Farnsworth Street

Convertors of Iron and Steel into Bolts, Expansion Bolts, Nuts, and all kinds of Structural Work for Mills, Churches, Halls, Factories, Bridges, Wharves, Etc., and Iron Work of all kinds forged and made to order. *Send for catalog.*

JOHN W. CROOKS, Treasurer
BOSTON, MASS.

To Make Money From Your Invention

it must be protected by such a PATENT as will enable you to completely MONOPOLIZE it and control infringers. I procure patents that stand the test of competition at a cost probably nowhere near as high as you may think. The patent law favors the DILIGENT, not the indolent, inventor, so send me TO-DAY a sketch or model, and explanation of your invention and I will furnish full advice. To morrow, next week, or next month may be too late. References on request.

GEO. R. HAMLIN, Patent Lawyer, 800 H Street, N. W., Washington, D. C.

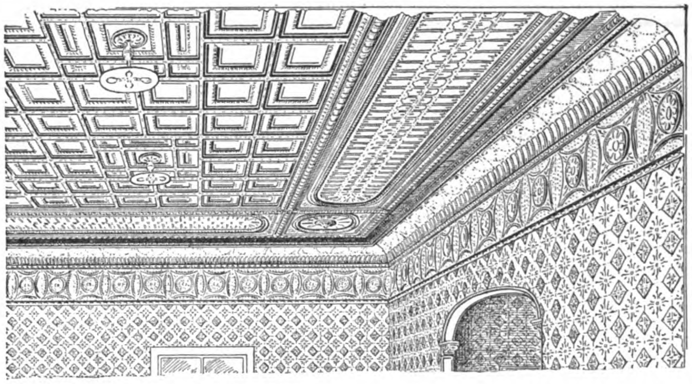
ASTEROID THE PERMANENT **ROOFING.** SCOTT & CO., 233 E. Front St. CINCINNATI, O. AGENTS WANTED

Selected Books For Carpenters

Hicks' Builders' Guide	$1.00
Meloy's Progressive Carpentry	1.00
Sylvester's Modern Carpentry and Building	1.50
Kidder's Building Construction and Superintendence, Volume 2—Carpenter's Work	4.00
Hodgson's Practical Uses of the Steel Square, Volumes 1 and 2, each	1.00
Hodgson's Modern Carpentry and Joinery	1.00
Shawver's Plank Frame Barn Construction	0.50
Stoddard's Steel Square Pocket Book	0.50
People's Pocket Stair Builder and Carpenter's Handbook	2.50
Maginnis' How to Measure Up Wood-Work for Buildings	0.50
Hodgson's Up-To-Date Hardwood Finisher	1.00
Maire's The Modern Wood Finisher	0.50
Easy Lessons in Roof Measurements	0.25
How to Become a Good Mechanic	0.25

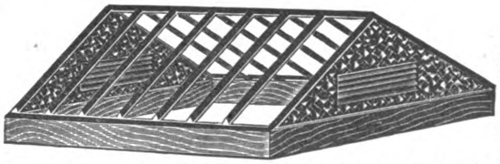
Our Descriptive List of books for the Building Trades sent on request.

David Williams Company
14-16 Park Place, NEW YORK



THE KINNEAR
LOCK-JOINT STEEL CEILING, Etc.
Has no equal. Try it and be convinced. Prices reasonable.
Catalog upon request. Send measurements for estimate.

The Kinnear & Gager Co., M'f'r's, COLUMBUS, OHIO
BOSTON, 125 Broad St



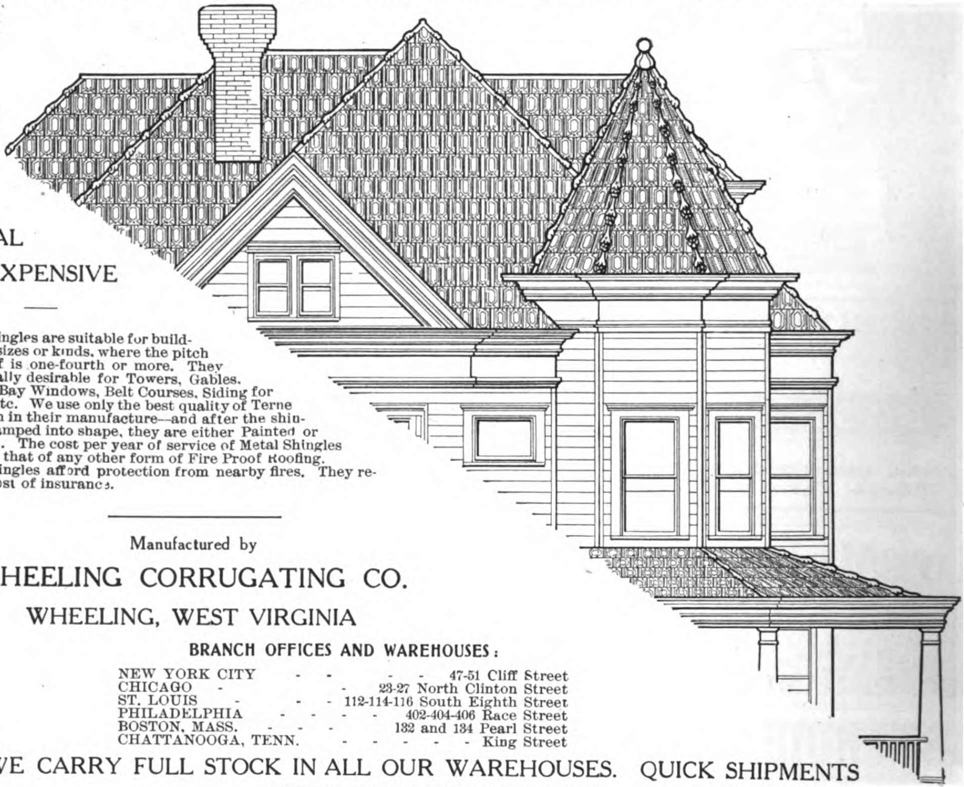
ART METAL CEILINGS

Exclusive and Artistic Designs appropriate for any style of architecture.

All Styles Galvanized and Copper Skylights, Cornices, Finials, Crestings, Ventilators, Metal Shingles, Roof Gutters, all styles painted and galvanized Iron Roofing and Siding, etc. Write for Catalogue and Prices. Estimates free.

Kanneberg Roofing & Ceiling Co.,
Manufacturers,
CANTON, OHIO.

DIXIE METAL SHINGLES—SO—EASY—TO—LAY—FIRE PROOF—



Weather Proof

A Perfect Lock

ORNAMENTAL

NOT EXPENSIVE

Metal Shingles are suitable for buildings of all sizes or kinds, where the pitch of the roof is one-fourth or more. They are especially desirable for Towers, Gables, Mansards, Bay Windows, Belt Courses, Siding for Cottages, etc. We use only the best quality of Terne Roofing Tin in their manufacture—and after the shingles are stamped into shape, they are either Painted or Galvanized. The cost per year of service of Metal Shingles is less than that of any other form of Fire Proof Roofing.

Metal Shingles afford protection from nearby fires. They reduce the cost of insurance.

Manufactured by

WHEELING CORRUGATING CO.

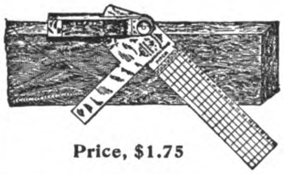
WHEELING, WEST VIRGINIA

BRANCH OFFICES AND WAREHOUSES:

NEW YORK CITY	47-51 Cliff Street
CHICAGO	23-27 North Clinton Street
ST. LOUIS	112-114-116 South Eighth Street
PHILADELPHIA	402-404-406 Race Street
BOSTON, MASS.	132 and 134 Pearl Street
CHATTANOOGA, TENN.	King Street

WE CARRY FULL STOCK IN ALL OUR WAREHOUSES. QUICK SHIPMENTS

LET US QUOTE YOU OUR PRICES



Price, $1.75

TOPP'S FRAMING TOOL.

A PERFECT TOOL and the only Tool for the purpose ever invented.

Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

Write for booklet. Address the manufacturers,

G. A. TOPP & CO., - Indianapolis, Ind.

SECURE

PROTECTION AND LONG SERVICE BY USING OUR

ASPHALT ROOFING

SAVES REPAIRS

SAVES RECOATING

SAVES RENEWING

Send for Samples and Pamphlet

STOWELL MFG. CO.

JERSEY CITY, N.J.

Its application is very simple— no experienced help is needed. With every roll are included nails, tin caps and cement sufficient for the work. **RUBEROID** is so pliable that it fits anywhere.

THE well-told truth has for 13 years drawn builders' attention to **RUBEROID ROOFING**—demonstration of this truth has made its believers legion. **RUBEROID ROOFING** does all claimed for it. It *is* water and weather-proof. Its resistance to acids, gases, great heat and even fire is extraordinary. It will *not* melt, rot or crack. But "above all things" avoid imitations. Look for the registered trade mark "**RUBEROID**" always stamped on the under side. Send for samples.

MANUFACTURED SOLELY BY

The Standard Paint Co.,

100 William St., New York.

Chicago Offices: 188-90 Madison St.

We Give Particular Attention To Special Designs

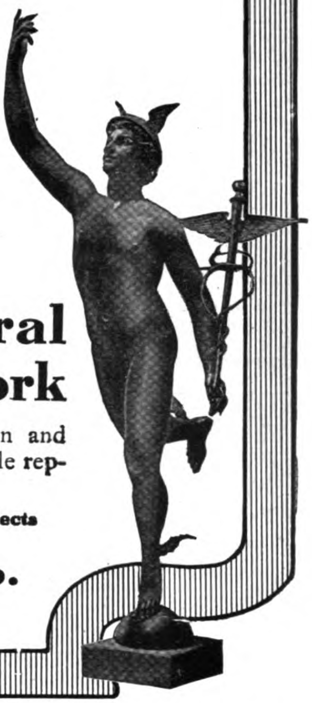
and are fully equipped to execute the most intricate and delicate work ever attempted in sheet metal.

Mullins
Art Architectural Sheet Metal Work

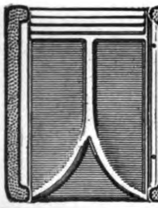
is far in advance in architectural design and artistic execution and has won an enviable reputation for excellence.

Estimates, Designs, etc., submitted to architects builders and contractors on request.

The W. H. Mullins Co.
208 Franklin St., Salem, Ohio.
(Everything in sheet metal.)

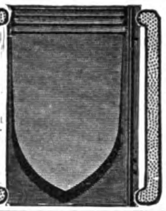


CORTRIGHT METAL SHINGLES



Who can drive a nail better than a carpenter? Then who has a better right to make money laying Cortright Shingles?

CORTRIGHT METAL ROOFING CO.
Philadelphia and Chicago



LOCK-JOINT METAL CEILINGS

are every day proving their superiority over the ordinary Lap Joint Ceiling.

Send for Catalogue "D"

S. Keighley Metal Ceiling & Mfg. Co.
PITTSBURGH, PA.

Brooklyn, N. Y.
Baltimore, Md.
Washington, D. C.
Boston Mass.

PLUMBERS' SUPPLIES
AT WHOLESALE.

If you need anything in my line, and wish to

SAVE
20 to 40 Per Cent

on every article, write for my free illustrated Catalog. Shipments promptly made from a very complete stock of guaranteed goods.

Small orders are as carefully handled as large ones.

B. C. KAROL, 235 W. Harrison St., Chicago, Ill.

TOP IT OFF

With our

No. 76 Cresting

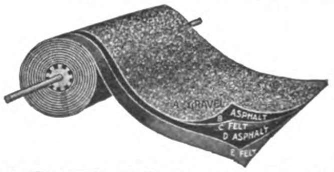
and be proud of your roof finish. Send for catalog No. 5 showing a very complete line of architectural metal work.

STEEL CEILING is a leading feature with us.

We make the W. H. Miller Patent Metal Window Frames and Sash. Special catalog on these. Originators of the hip shingles.

WILLIS MFG. CO., - - Galesburg, Ill.

A Built-Up Gravel Roof Ready To Lay.



"SECURITY"

(Registered U. S. Patent Office.)
Note the Patent 6 inch Joint.

The National Roofing Company
TONAWANDA, N. Y.

WALTERS'

Shingles that last

Made from Galvanized Tin and Painted Tin
STORM, RUST AND FIRE PROOF
Do you want to increase your business? THIS IS YOUR OPPORTUNITY. Write for catalogue, samples and prices.
National Sheet Metal Roofing Co.,
JERSEY CITY. N. J.

"STAR ENCAUSTIC TILE CO.,"
MANUFACTURERS OF
Superior Unglazed Encaustic Tile
For Floors in Stores, Churches, Depots, Kitchens, Halls, Porches, &c.
Office and Factory, Bluff Street, near Gist,
PITTSBURG, PA.

Progressive Carpentry.

By D. H. MELOY.

Embodies results of a Study of All Known Methods of Construction During a Fifty Years' Experience of the Author.

It has forty-two examples of work covering roof framing, trussing, etc., all thoroughly tested in practice. Each example is accompanied by a full-page diagram illustrating the method of construction.

Several thousand mechanics have used this book and proved its value.

No carpenter will fail to find it worth **something more** than the purchase price.

One Dollar Postpaid.

David Williams Company
14-16 Park Place,
NEW YORK.

Eller's Metal
STOVE PIPE IRON.
CORNICE.
SKYLIGHTS.
EAVESTROUGH.
CONDUCTOR PIPE.
TIN PLATE Ceilings
STEEL ROOFING & SIDING. SOLDER ETC.
THE ELLER MFG. Co SUCCESSOR TO J.H. ELLER & Co
CANTON, OHIO.

For More Light on the Subject send for our PHOTO-PAMPHLET
PERFECTED GRANITE ROOFING

Combines durability, low price, ease of application, fire-proof qualities and sightliness, just what the buyer of roofing material demands.

The cheapest way to repair old shingle roofs is to cover with PERFECTED GRANITE ROOFING.

SEND FOR PHOTO PAMPHLET.

Eastern Granite Roofing Co., Irving Building, New York.

PAINT—GOOD PAINT—serves a dual purpose. It preserves and beautifies. It preserves simply by excluding "the weather"; it beautifies by tint and color. The longer it excludes "the weather," the longer it retains its original tint and color, the better is the paint.

Paints based on OXIDE OF ZINC remain longer impervious than other paints and they retain their pure tones long after other paints have faded or darkened.

. . . FREE . . .
Our Practical Pamphlets:
"The Paint Question."
"Paint: Why, How and When."
"Paints in Architecture."
"Specifications for Architects."
"French Government Decrees."

THE NEW JERSEY ZINC CO.
71 Broadway
NEW YORK

WE DO NOT GRIND ZINC IN OIL. LISTS OF MANUFACTURERS OF OXIDE OF ZINC PAINTS WILL BE FURNISHED ON REQUEST

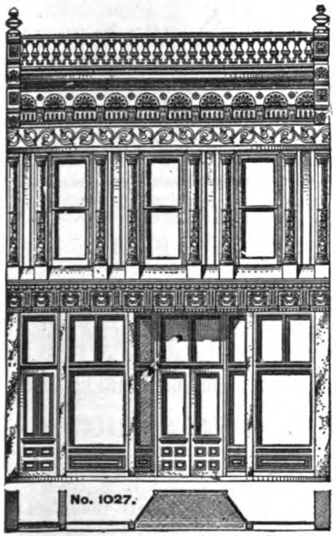
PRODUCERS OF
ROOFING SLATE
SLATE BLACKBOARDS.

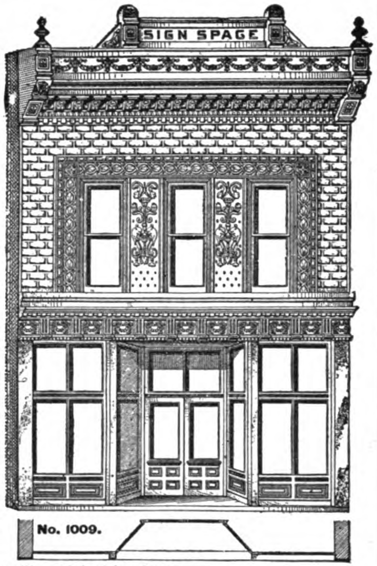
THE E. J. JOHNSON CO.
38 Park Row,
New York.
Quotations delivered anywhere.
Slaters' Supplies, Snow Guards.
Write for Price Book

MONTROSS METAL SHINGLES

The profits are large, the work easy. That's why you ought to get the agency to lay all roofs in your territory. Send for particulars.
MONTROSS METAL SHINGLE CO., Camden, N. J.

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google


No. 1027.



No. 1009.

25 feet wide—lower ceiling 12 feet in clear.

Net price F. O. B.	St. Louis, Mo..........	$209.00	Net price F. O. B. St. Louis, Mo.......... $187.00
" "	New York, N. Y.......	238.00	" " New York, N. Y....... 212.00
" "	St. Paul, Minn.	229.00	" " St. Paul, Minn. 204.00
" "	Denver, Colo..........	268.00	" " Denver, Colo.......... 239.00
" "	Dallas, Tex.	253.00	" " Dallas, Tex. 225.00

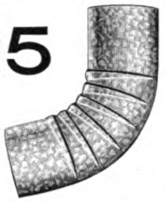
Galvanized Sheet Steel Fronts

The designs presented herewith illustrate our complete and modern store fronts. The prices include the steel sill course, steel vestibule plate, steel angle columns for covering end walls, steel intermediate box columns; show sash, store doors, transoms, door posts, box window frames with sash of white pine 1¾ in. thick; all glass for same of double strength; galvanized iron work above first-story columns.

We make and ship over 800 fronts annually from 20 to 800 feet in width and from one to five stories high. Having given the manufacture of complete fronts our most careful study for over thirty years, they are now the best, cheapest and most elaborate in the market. Owing to their simple and practical construction, any mechanic, whether experienced in this particular line or not, can erect them, aided by a set of full-size details and instructions that we furnish. We desire to introduce this class of work in every city in the United States, and solicit the correspondence of architects, builders and others contemplating the erection of buildings. Send for references, full descriptive catalogue and discounts. **Established 1846.**

MESKER & BROTHER,
421-519 S. SIXTH STREET - - - ST. LOUIS, MO. U. S. A.

1225 VARIETIES of Conductor Elbows



ARE MADE BY

F. Dieckmann

1182 Harrison Ave.
Cincinnati
O.

THE LOVELL WINDOW AND SHUTTER OPERATING DEVICE

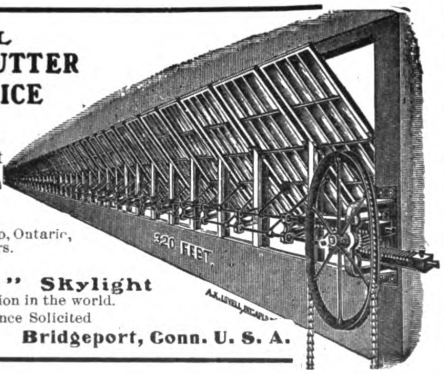
For Factories, Foundries, Etc.

A line of sash 500 feet long can be operated from one station if desired.

THE VOLKES HARDWARE CO., Toronto, Ontario,
Sole Canadian Manufacturers.

WE ALSO MAKE
The "Anti-Pluvius" Skylight
Best skylight construction in the world.
Correspondence Solicited

The G. DROUVÉ CO., Bridgeport, Conn. U. S. A.



Reduced Rates for Telephone Service

throughout Greater New York are effective from July 1st. Contracts now being taken at new rates.

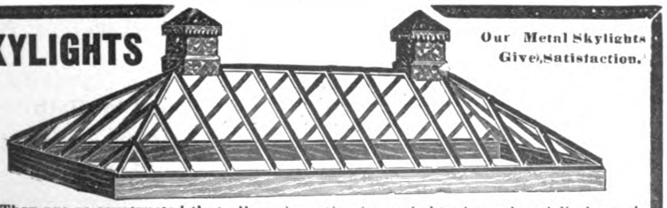
Call nearest Contract Office for full information.

NEW YORK TELEPHONE COMPANY

Contract Offices:	*Telephone No.:*
15 Dey Street	9010 Cortlandt
115 West 38th Street	9040-38th
220 West 124th Street	9000 Morningside
616 East 150th Street	9020 Melrose

SKYLIGHTS

Our Metal Skylights Give Satisfaction.



They are so constructed that all condensation is carried to the curb and discharged through weep holes on to the roof without soaking between laps.

The peculiar construction of the curb on our skylights renders counterflashing unnecessary.

Frames of galvanized iron or copper, with glass of any kind or thickness.

Write for our New Cornice, Skylight and Ornament Catalog.

THE CANTON STEEL ROOFING CO., Canton, Ohio

DO YOU WANT THE BEST

DRAWING TABLE

made? If so send for illustrated catalogue and prices.

R. E. KIDDER,
22 Hermon Street, Worcester, Mass.

BUY . . . .
LUMBER
DIRECT

WE MANUFACTURE ALL KINDS.—MOULDINGS, WINDOWS, DOORS, BLINDS. MIXED CARS, INCLUDING EVERYTHING FOR A BUILDING. STRAIGHT CAR-LOADS SHINGLES, SIDING, FLOORING, WHITE PINE, AT WHOLESALE PRICE.

"Our complete Catalog and Price List of all kinds of Building Material would be a great help to you in figuring."

LESTERSHIRE LUMBER & BOX CO., LESTERSHIRE & BINGHAMTON, NEW YORK.

PEERLESS MORTAR COLORS.

THE BRIGHTEST, STRONGEST AND MOST DURABLE.

SPECIAL SHADES MADE TO ORDER.

BUCK LEAD
WILL NOT
CHALK, CRACK,
NOR PEEL OFF

ESTABLISHED 1844.
SAMUEL H. FRENCH & CO.,
PHILADELPHIA.

CROWN PAINT
READY MIXED IN
PURE LINSEED OIL
GIVES SATISFACTION

THE "GLOBE" VENTILATOR

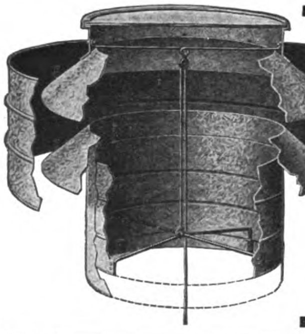
In Brass, Copper, Galvanized Iron and with Glass Tops for Skylight Purposes. Also

"Globe Ventilated Ridging"

For Barns, Residences and Buildings of every character. Far superior to a Cupola.

Send for Description and Price List.

Manufactured by **GLOBE VENTILATOR CO.** Troy, N.Y.



THE "BURT" VENTILATOR is no experiment; has been on the market nearly 5 years; is used by the most prominent concerns in the Country. The "Burt" is the only Ventilator on the market with the sliding sleeve damper (patented). This damper is ideal where glass tops are used, as the ventilator can be closed, yet the skylight feature is never affected—always free and open. The temperature can be regulated better, damper never moves and never collects dust.

Before purchasing a ventilator of any make, send for our finely illustrated booklet describing in detail our claims for the "Burt." MADE IN ALL SIZES, BOTH GLASS AND METAL TOPS.

THE BURT MANUFACTURING CO.
301 Main Street, Akron, Ohio, U.S.A.
Largest Manufacturers of Oil Filters and Exhaust Heads in the World.

ELEVATOR ENCLOSURES

We are large manufacturers of Elevator cars and Enclosures. Also Bank and Office Grille Work. Window Guards, Ornamental Wire, Iron, Steel and Brass work of every description in any finish. Our workmanship cannot be excelled.

Send for Catalogue.

F. J. MEYERS MFG. CO.
HAMILTON, OHIO, U.S.A.

THE NEW BOOK

"Strength of Beams, Floors and Roofs"

Makes easy the Designing and Figuring of Wooden Beams and Trusses.

TWO DOLLARS, PREPAID.

DAVID WILLIAMS COMPANY, Publishers, 14-16 Park Place, New York.

NEW BOOKS
On Concrete Blocks

CONCRETE-BLOCK MANUFACTURE
PROCESSES AND MACHINES

By H. H. RICE

152 Pages. 46 Half-tone Cuts

Includes several illustrations of recently built concrete-block houses.

Bound in Cloth
Price, $2.00, Postpaid

THE MANUFACTURE OF

CONCRETE BLOCKS

And Their Use in

Building Construction

By
H. H. RICE, D. M. TORRANCE
and others

125 Pages. Illustrated

Presents a series of articles submitted in competition for money prizes offered jointly by "Engineering News" and "Cement Age," of New York City.

Bound in Cloth
Price, $1.50, Postpaid

David Williams Company
14-16 Park Place, New York

STORE ELEVATOR FOR $105 $

COMPLETE, READY TO ERECT, MADE BY THE HUNDRED. SIMPLE IN CONSTRUCTION. EASILY CARED FOR. OTHER STYLES AND PRICES TO SUIT.

The Warner Elevator Mfg. Co.
2100 Valley St., CINCINNATI, O.
NEW YORK OFFICE: 2032 PARK ROW BUILDING.

MORSE
HAND ELEVATORS and DUMB WAITERS
SAFE SMOOTH RUNNING DURABLE

Sold with or without lumber. All necessary drawings and instructions for erecting are furnished. Full particulars on request. Write us.

Morse, Williams & Company
PHILADELPHIA ATLANTA BOSTON

THE NEW YORK STEEL CORNER PLATE CO.
—SUPPLY—
The Parker Steel Corner Bead for the Protection of Plastered Corners
Outlines a perfect corner. The best Corner Bead in the market. Fits any ground.
Endorsed by Leading Architects, Builders and Plasterers.
Telephone 876 Madison Square.
All communications to 1135 B'way, N. Y. C.

To the Student of Drawing

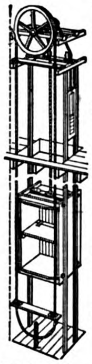
For a thorough groundwork in architectural—draftsmanship there is no course of study equal to that provided in Edminster's Architectural Drawing. It is modern, thorough and well graded.

Contains 105 full page plates beautifully rendered, illustrating the various details of construction, &c., and full explanatory text.

Size 7 x 9 inches, oblong
Two Dollars Prepaid

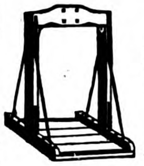
David Williams Co., Publishers
14-16 PARK PLACE, NEW YORK

BOOKS. YOU CAN OBTAIN PROMPT ADVICE regarding the books on any subject in which you are interested by addressing DAVID WILLIAMS COMPANY, Publishers and Booksellers, 14-16 Park Place., N. Y.



DUMB WAITERS AND HAND ELEVATORS.
Trunk Lifts,
Invalid Lifts,
Carriage Elevators,
Freight Elevators,
Sidewalk Elevators,
Hatchway Hoists.
All of most improved design and construction.
Sedgwick Machine Wks.,
88 Carroll Street,
POUGHKEEPSIE, N. Y.
New York Salesroom, 128 Liberty St.
Catalogue on application.
Estimates on request.

Improved Quick and Easy Rising Steam, Electric and Hand Power Safety
ELEVATORS
AND DUMB WAITERS.
Automatic Hatch Gates.
Send for Circulars.
KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kimball Elevator Co., Cleveland, Ohio, 245 Vincent St
Branch Offices:
120 Cedar St., New York. 108 11th St., Omaha, Neb



ELEVATORS AND DUMBWAITERS
that can be placed in position by any carpenter.
Catalogue Free.
Energy Elevator Co.
407 Cherry St., - Phila., Pa.

Estimating!

Estimating the cost of a job safely and correctly is the most vital element of success to the contractor. Therefore he should have a copy of ***The Lightning Estimator*** for residence work, etc. Illustrated. Covers the entire field for the mason and carpenter, teaching a new practical, reliable method, showing the exact cost of each separate item of the labor and material, but so arranged that a medium priced house may be estimated in 30 to 60 minutes. For the busy builder. Is having the most phenomenal sale and splendid endorsement of any book of its kind ever put upon the market. In a class by itself. Prepared by a builder of experience from actual building construction, not theory. Large sales permit us to sell the book for 60 cents. (Money order.) You cannot afford to wait. Write now.

BRADT PUB. CO.,
260 Michigan Avenue, JACKSON, MICH.

VALUABLE INFORMATION
FOR THOSE WHO
Build, Buy or Rent a Home
Send postal for descriptive booklet.
HOUSE HINTS PUB. CO. Dept. 34, Philadelphia

— HANS JENSEN, a Dane, appeared before a Kansas Judge to take out naturalization papers. "Hans," said the Judge, "are you satisfied with the general conditions of the country? Does this Government suit you?" "Yas, yas," replied the Dane, "only I vould like to see more rain." "Swear him!" exclaimed the Judge. "I see that he already has the Kansas idea."—*Ram's Horn.*

LOOK OVER THE SIMONDS SAWS, and you will see the points of advantage.

FIRSTLY, they are ground a true taper, which enables the user to run the Saw with very little Set.

SECONDLY, each Simonds Saw is handled by a mechanic who thoroughly understands the hanging of the Saw, which guarantees this most important feature.

THIRDLY, the filing and setting of the Simonds Saws are carefully done, and thoroughly inspected, so that the Saws, on leaving the factory, are ready for work.

FOURTHLY, the steel used in the manufacture of the Simonds Saws is a high carbon crucible steel, and will hold its cutting edge much longer than the ordinary steel generally used.

FIFTHLY, each Saw is put up in a separate case, thus avoiding fingering and rust marks commonly found on Saws that are not encased properly.

SIXTHLY, because every Simonds Saw is guaranteed thoroughly.

Any mechanic trying a Simonds Saw, and not finding same satisfactory, may return the Saw, either to the dealer or to the Simonds Mfg Co., and get either a new Saw or money paid back.

SEND FOR CATALOGUE AND PRICE LIST.

SIMONDS MFG. CO.,

Fitchburg, Mass. Chicago, Ill. New York, N.Y.
Portland, Ore. Seattle, Wash.

SIMONDS MFG. CO., Ltd., New Orleans, La.
SIMONDS SAW CO., San Francisco, Cal.

STANDARD MINERAL WOOL

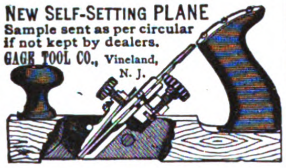
LOOKING ALL WAYS FOR BUSINESS

COLUMBIA MINERAL WOOL CO.,
Room 918, 112 Clark St., CHICAGO.
Samples and Circulars Free

NEW SELF-SETTING PLANE

Sample sent as per circular if not kept by dealers.

GAGE TOOL CO., Vineland, N. J.



Irons warranted. Plane is returned money refunded.

MILLER'S HAND MORTISER

For Mortise Locks. Time Per Door, Three Minutes

Sold on Trial for $12.00
$4.00 with order, balance in thirty days.

ALBERT W. MILLER MFG. CO.
Cincinnati, Ohio, and Riverside, Cal.

Bolcoa

TRADE MARK

ETCHING FLUID

Will mark your tools in a manner impossible to erase, without destroying the article itself. Protect yourself against loss and theft. Easy of application. **Price 25 cents.** We handle a full line of tools. Let us know your wants.

Reed & Auerbacher Co.
229 Bowery, N. Y.

Fireplace Mantels

MADE OF

Ornamental Brick

$12 and up.

Last longest—look best—are not too costly. There's no other kind so good—so pleasing. Our Sketch Book tells all about them. Write for it.

PHILA. & BOSTON FACE BRICK CO. - P. O. Box 8613 - BOSTON, MASS.

OUR FINE HARDWOOD FLOORING

SHOULD BE THE BEST.

We have been making PARQUETRY for TWENTY YEARS. We have our own saw mill and timber tracts and two factories. Send for our trade discounts and our Design Book No. 5.

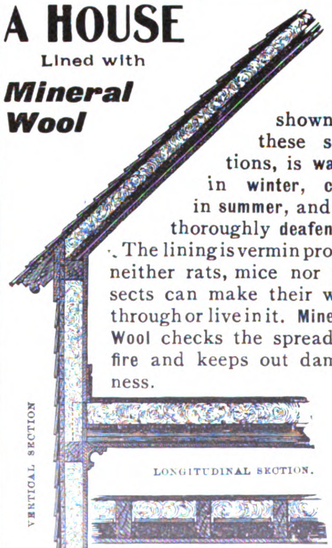
WOOD-MOSAIC FLOORING CO.
ROCHESTER, N. Y. NEW ALBANY, IND.

A HOUSE

Lined with

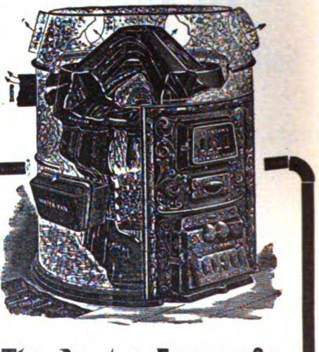
Mineral Wool

As shown in these sections, is warm in winter, cool in summer, and is thoroughly deafened. The lining is vermin proof; neither rats, mice nor insects can make their way through or live in it. Mineral Wool checks the spread of fire and keeps out dampness.



Sample and Circular Free.

U. S. MINERAL WOOL CO.,
143 Liberty St., New York.



The Boynton Furnace Co.

SOLE MFRS. OF

**Boynton's Furnaces,
Ranges,
Hot Water Heaters,
Steam Heaters, Etc.**

207-9 Water Street, New York.
147-9 Lake Street, Chicago.

EVERY Builder who reads, investigates and progresses will have a copy of Kidder's Strength of Beams, Floors and Roofs. $2.00 prepaid.

DAVID WILLIAMS CO. 14-16 Park Place, N. Y.

Carpentry and Building

New York, July, 1906.

Cement Coated Residence with Hollow Block Foundations.

THE tendency toward fireproof construction in private dwelling houses is well illustrated at the present day by the growing use of hollow building blocks for the walls and foundations and also by the employment of cement on metal lath for the entire exterior treatment of the structure. Not alone are the fire resisting qualities of a building multiplied by such a form of construction, but it is thereby made much cooler in summer and warmer in winter. The cement coating may or may not be tinted, according to preference, but the opportunity is afforded for the adoption of a color scheme if such is desired. A most interesting exemplification of the tendency in question is seen in the residence which we illustrate herewith, where the exterior of the building is cement coated and the foundations and veranda wall are of hollow concrete blocks. The half-tone picture shows the appearance of the finished structure, while the two supplemental plates accompanying this issue give an excellent idea of the interior finish. One represents a view in the dining room, showing the mantel, buffet, &c., and the other is a view in the main hall, looking toward the stairs and into the parlor at the right.

Residence of Mrs. George C. Ford on Westfield Avenue, Elizabeth, N. J.

Cement Coated Residence with Hollow Block Foundations.

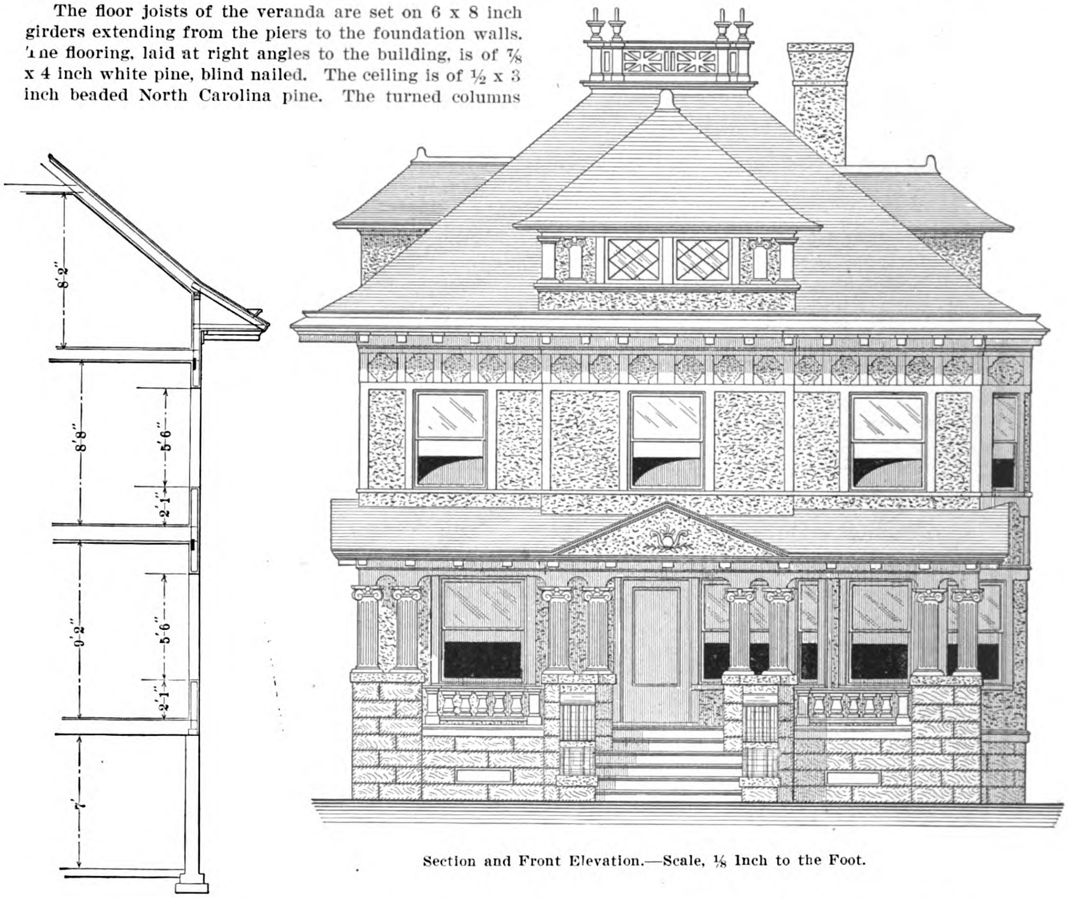
As already intimated, the foundation walls, buttress piers and the walls under the veranda are of patent cement building block, made rock face where exposed above grade. The blocks are laid in Portland cement mortar composed of one part cement and three parts sharp sand. The footing courses under all piers and chimney are of concrete composed of one part cement, four parts sharp sand and five parts 2-inch broken stone. The coping stones on the veranda piers are 5 inches thick and of concrete. The cellar bottom is covered with concrete 3 inches deep composed of one part Portland cement and three parts cinders, with a finishing coat 1 inch thick, composed of one part cement and three parts sand. The chimney is of brick, with the portion exposed to view covered with Portland cement and topped with a concrete cap.

According to the specifications of the architects the timber used in the building is hemlock, the girders in the cellar being 6 x 8 inches; the sills, 4 x 6 inches, solid; the first floor joists, 2 x 10 inches; the second floor joists, 2 x 12 inches; the third floor joists, 2 x 8 inches, and the third floor ceiling joists, 2 x 4 inches, all set 16 inches on centers; the rafters, 2 x 6 inches, set 20 inches on centers; the outside wall studs, 2 x 4 inches; the door and window studs, 3 x 4 inches; the partitions, 2 x 3 and 2 x 4 inches, these being set 16 inches on centers; the ribbon strips, 1 x 6 inches; the bridging, 2 x 3 inches and the plates, 4 x 4 inches, made up of two 2 x 4's spiked together. The veranda floor joists are 2 x 10 inches set 16 inches on centers. The ceiling joists are 2 x 4 inches and the rafters are 2 x 6 inches, set 20 inches on centers. The floor joists are double around the chim-

ney and stair wellhole and under all partitions running the same way.

The exterior frame of the house is covered with ⅞ x 9 inch North Carolina pine boards put on level and driven up close, over which is a layer of heavy tar paper. This in turn is covered with Portland cement plaster of an even color, on metal lath, the proportions being one part cement and three parts sharp sand. All the casings on the outside of the house were set before the cement was applied. Pieces ⅞ inch thick are cut in between the outside wall studs on the first, second and third floors, forming an effective fire stop. The main roof of the building as well as the dormers are covered with red cedar shingles laid 5½ inches to the weather, with hips "Boston style."

The floor joists of the veranda are set on 6 x 8 inch girders extending from the piers to the foundation walls. The flooring, laid at right angles to the building, is of ⅞ x 4 inch white pine, blind nailed. The ceiling is of ½ x 3 inch beaded North Carolina pine. The turned columns are 12 x 12 inches, having turned bases and pilaster caps. The columns are of the patent staved type, made of white pine and fluted. The balustrade is made with a 3 x 8 inch top rail of dressed spruce, molded on the edges.



Section and Front Elevation.—Scale, ⅛ Inch to the Foot.

Cement Coated Residence with Hollow Block Foundations.—J. A. Oakley & Son, Architects, Elizabeth, N. J.

The floors of the house are ⅞ x 3 inch tongued and grooved North Carolina pine, blind nailed. The trim is chestnut except the bathroom, which is trimmed with white wood, painted. The trimmed opening between the main hall and the parlor has panelled and molded head jamb with pilasters of ⅞ inch lumber and fluted. The beams in the dining room ceiling are built of ⅞ inch lumber with sunken panels in the soffit. The panel work on the side wall of the dining room is made with ⅞ x 3 inch stiles, rabbetted for the panels, the bottom rail being 8 inches wide and the top rail 9 inches. There is also a plate rail plowed in two places on top and with neat brackets underneath. The main stairs are built with closed strings and have a curb around the second floor wall to match the strings. The strings and risers are of chestnut and the treads of Georgia pine. The newels are of chestnut built up of ⅞ inch lumber fluted and have molded caps and a base with molding on top of it. The main newel is 8 x 8 inches and the others are 6 x 6 inches. The rails are of ash and the balusters are turned and square chestnut set 2 inches apart. The main hall and bathroom have the floors laid on 6 inches of concrete mixed in the proportions one to three. The bathroom is fitted with a Standard Manufacturing Company Albion porcelain lined 5-foot tub with exterior decoration and nickel plated fittings and a "Copley" lavatory, also a John Douglass "Gloria" low down porcelain water closet outfit complete. The bathroom is finished with a coat of shellac and two coats of white paint, over which is a coat of enamel.

The house is steam heated; is piped for gas and wired for electric lighting and burglar alarms, with electric bells in the kitchen and second story hall. There are intercommunicating telephones in the front bedroom, kitchen and in the finished room in the attic. There is an annunciator in the sewing room, on the second floor, with "drops" for the cellar, rear entry, kitchen, butler's pantry, kitchen pantry, dining room, main hall and parlor.

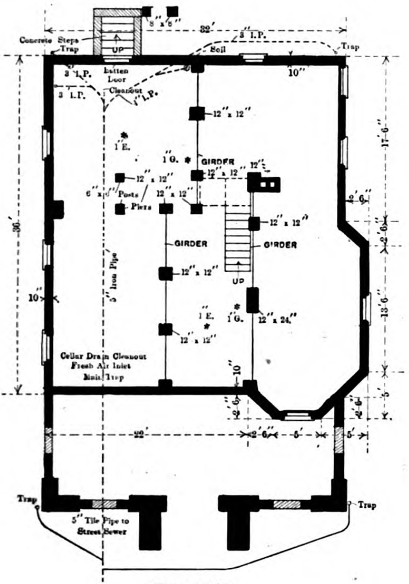
The entire exterior wood work of the house, including corner boards, casings, cornice, columns, &c., have two coats of white lead and linseed oil. The porch ceiling has a coat of liquid wood filler and two coats of Spar varnish. The interior wood work except the floors have a coat of best filler and two coats "Elastica" varnish. The side walls and ceilings in the bathroom, kitchen, pantries, rear entry and the rear stairway have two coats of paint, while the walls and ceilings of the other rooms are papered and tinted.

The residence here shown is located on Westfield avenue, directly opposite Grove street, Elizabeth, N. J., and was erected for George C. Ford in accordance with

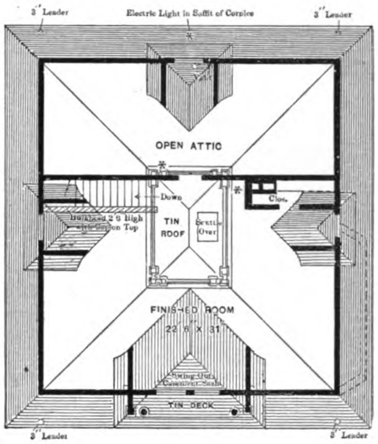
plans prepared by J. A. Oakley & Son, registered architects, 1201 East Broad street, Elizabeth, N. J.

Fire Underwriters' Opinion on Concrete Construction.

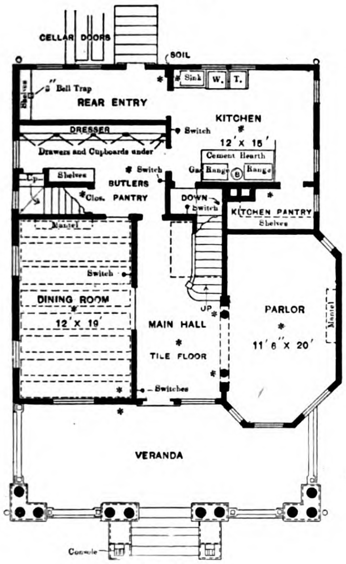
A short time ago the Committee on Construction of Buildings made a report to the National Board of Fire Underwriters touching its "Model Building Code," and in which considerable space was given to the subject of concrete construction. In view of the extent to which concrete is being used at the present time in connection with the erection of buildings and for other purposes the following extracts from this report may not be without interest:



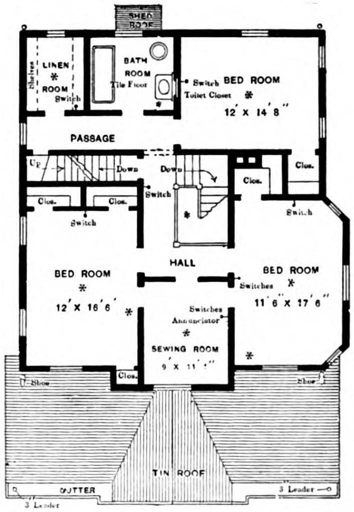
Foundation.



Attic with Outline of Roof.



First Floor.



Second Floor.

Cement Coated Residence with Hollow Block Foundations.—Floor Plans.—Scale, 1-16 *Inch to the Foot.*

"The National Board of Fire Underwriters, through the Committee on Construction of Buildings, has prepared during the past year a building code designed to secure uniform building laws throughout the country. Every effort has been employed to make this code as complete and comprehensive as possible, and the committee has been assisted in its work by experts of the highest authority in the art of building construction.

"We are pleased to be able to report that the code has met with general approval, especially of engineers, architects, builders and other practical people having to do with building construction, and it is gratifying to your committee that we have been informed of many cities and towns where it has been made the basis of a new building law or of an intelligent revision of existing ordinances. Our circular letter and subsequent correspondence resulted in a large number of replies which clearly manifest a wide interest in the subject and encourage us to believe that the action of the board cannot fail to result in future benefit to the interests of both fire insurance companies and the general public.

"Numerous inquiries regarding concrete construction by members of the board and others lead the committee to attempt a word by way of explanation:

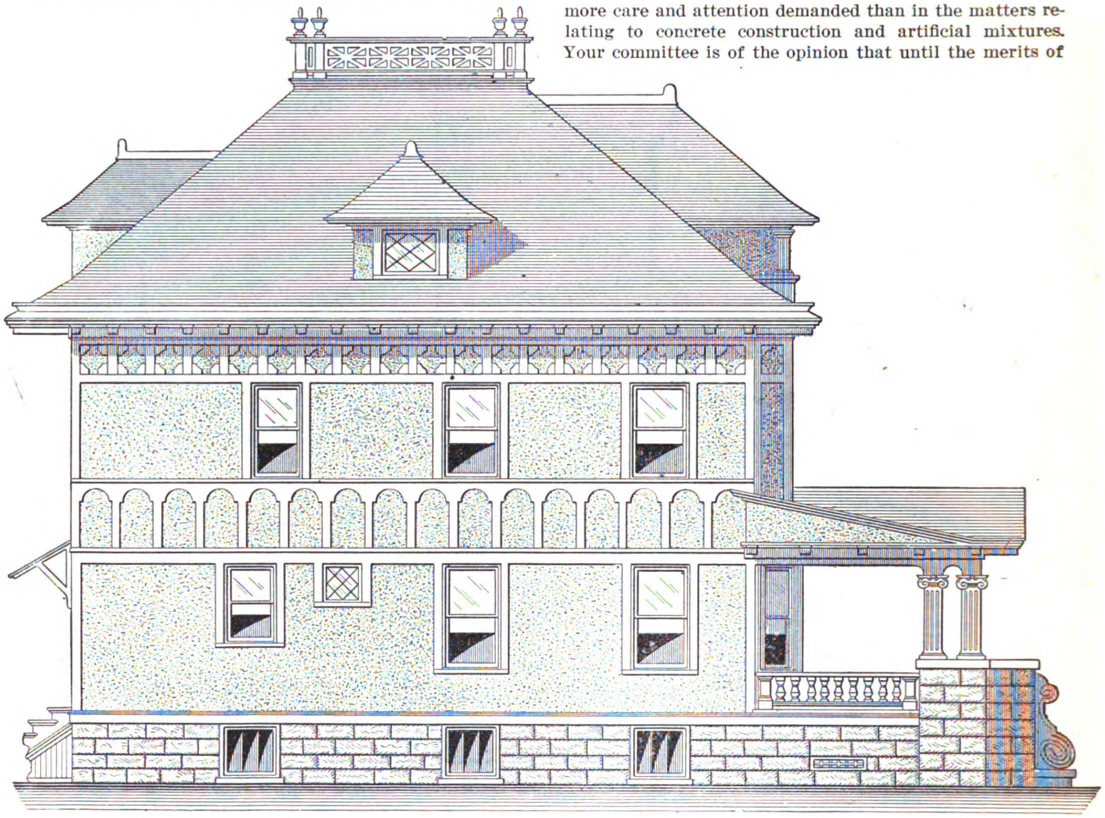
"Cement is recognized all over the civilized world as one of the most valuable adjuncts in building operations. Its manufacture has assumed vast proportions in this country within a comparatively few years. In the construction of buildings, from cement and sand mixed being used for mortar in laying up stone and brick walls, or

cement and sand and broken stone mixed being used as concrete for footings of walls and piers, the use of cement with other aggregates has enormously increased within the past 15 or 20 years for floor filling between steel beams, for partitions, and still more recently for outer walls.

"The great danger to be apprehended from the use of cement combined with other materials is its commercial mixture, and its use in freezing weather. With the best materials, good cement, clean, sharp sand of proper size sand grains, and small, clean, broken stone or gravel, comes the careless and improper mixture of the several parts, in the hurry of building operations, the mixing being done more frequently by unskilled labor than by machinery. In other cases where the mixture is cement, ashes, cinders and clinkers or other partially carbonized material, with possibly some sand, the ashes frequently contain refuse vegetable matter, and these aggregates often being carelessly mixed, the result is an utterly unreliable product. Good and poor cement mixtures are alike affected in very cold weather by the free water in the mixture freezing before it becomes combined by crystallization in the process of hardening, or setting, as it is called; the disintegration being due to the expansive force of ice. In the use of concrete constructed walls a variety of constructions have to be considered; solid concrete, hollow blocks of concrete, where the voids or spaces are as great or greater than the solid material, concrete combined with wire cloth or bars, commonly termed reinforced concrete, many of such devices being patented, and involving serious questions as to the proper allowance of strength to be given to the iron and to the concrete when the two are united.

"It will be seen, therefore, that the task of formulating exact regulations for concrete construction is very difficult, if not impossible. The National Board Code provides for the proper use of cement combined with other materials as far as the same are known or have been tested by authorities, although such tests have not included the supreme test of time, long outdoor exposure, or fire and water—or all of these combined. Nature's verdict is often different from man's. The quality of cement that shall be used in the construction of buildings, the mixture and kinds of materials in making mortar and concrete, its use and thickness for various purposes, including the filling of spaces between floor beams, are fully and properly set forth; for reinforced concrete or concrete-steel constructed buildings the code contains elaborate requirements believed to correctly embody the best known practice of to-day for this branch of the art of building.

"The entire code needs to be carefully and constantly watched and bettered as future experience may, and undoubtedly will, teach, but perhaps in no particular is more care and attention demanded than in the matters relating to concrete construction and artificial mixtures. Your committee is of the opinion that until the merits of concrete construction are more firmly established it will be unwise to make any change in our code."



Side (Left) Elevation.—Scale, 1/8 Inch to the Foot.

Cement Coated Residence with Hollow Block Foundations.

Brick vs. Frame Houses.

In a recent competition conducted by a Northwestern brick concern a prize was offered to local draftsmen for the best essay on the comparative merits and cost of brick and frame construction, as exemplified in private residences. The committee having charge of the matter selected for first place the paper of A. Anderson of Minneapolis, which is as follows:

As to the comparison of cost, wood is taken for granted as being cheaper than brick, but considering the rapid rise in lumber during the past few years and its assurance of continuing to do so in the future, due to the consumption of nearly all of the great lumber tracts, it is not so cheap a material as might at first be thought. All will agree that a frame structure has a picturesque appearance, but its durability is limited. Consider this same building after being exposed to the elements for a

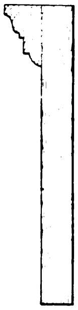
short length of time. Repairs will be found necessary and it is safe to say repairs will be a necessity forever after. Is this true of a brick structure?

Brick is a most valuable building material, wonderfully durable, as the ancient Roman buildings testify, and likewise fireproof, as has often been demonstrated. Many think of a brick structure as having an ugly and unfinished appearance, but they are at fault. The builder's workmanship may be criticised, but never the material. The countless European examples will demonstrate the fact that brick can be used with most excellent effect. Bricks are now manufactured in innumerable shapes, and good moldings can be obtained for cornices, belt courses, &c.

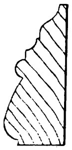
The main feature of the face of building is the style of brick selected, and in most cases pressed brick is used with the best results. This may be backed by a wall of a cheaper grade of brick, but will not prove an impenetrable wall for the cold or moist atmosphere. A frame construction can be elevated with a facing of pressed brick, but this may be criticised as not being weatherproof nor as durable as brick, yet the cost is about the same. The most satisfactory in every respect is the tile backing, which contains a double air space and prevents both the cold and moist air from entering the room. A house with tile backing will be warm during cold weather and cool during hot weather, assuring greater comfort than could otherwise be obtained.

By employing actual figures a better comparison may be obtained. Let us assume a house to be 30 x 40, with basement, first floor and second floor hights 8 feet, 9 feet 6 inches, and 9 feet respectively. For a comparison only the finished exterior walls, including interior plastering of same, will be taken into consideration, as the interior finish will remain the same in all cases.

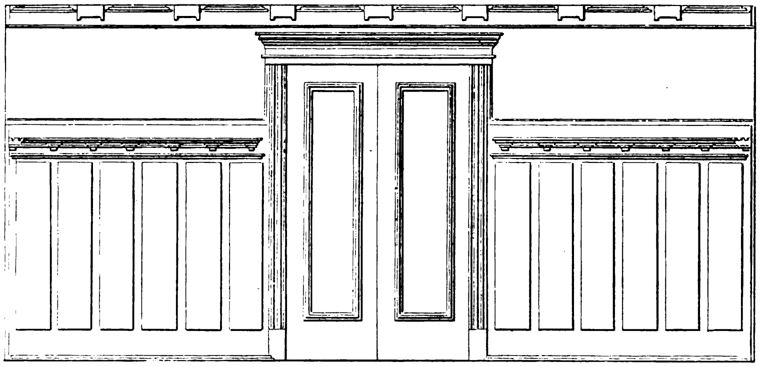
1. The frame structure with three coats of paint will amount to $2,435.



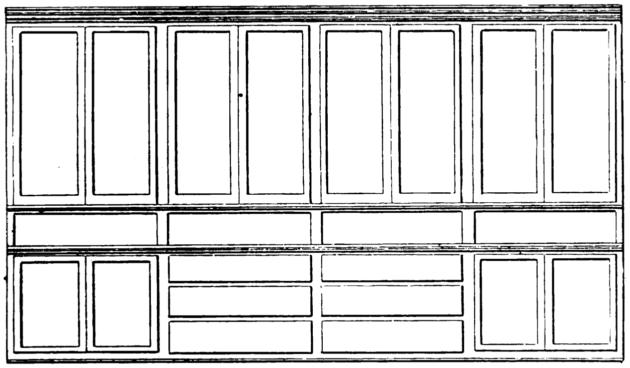
Head Casing for Second Story.—Scale, 3 Inches to the Foot.



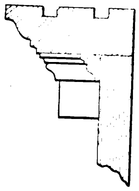
Base Mold.—Scale, 6 Inches to the Foot.



Detail of Dining Room Finish.—Scale, ¼ Inch to the Foot.

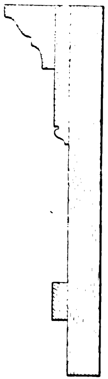


Elevation of Dresser.—Scale, ¼ Inch to the Foot.



Detail of Plate Rail.

Section of Casing.



Head Casing for First Story.

Scale, 3 Inches to the Foot.

Miscellaneous Constructive Details of Cement Coated Residence with Hollow Block Foundations.

2. A frame construction with pressed brick veneering at $20 per thousand will cost about $248 more than the frame.

3. A pressed brick veneering at $20 per thousand with tile backing will cost about $263 more than the frame structure, or $35 more than the frame construction with brick veneer.

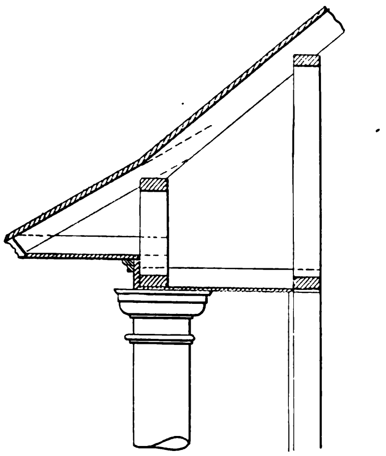
4. The solid brick wall with pressed brick facing at $20 per thousand will cost about $363 more than the frame structure, or $15 more than the frame construction with brick veneer, and $80 more than brick with tile backing.

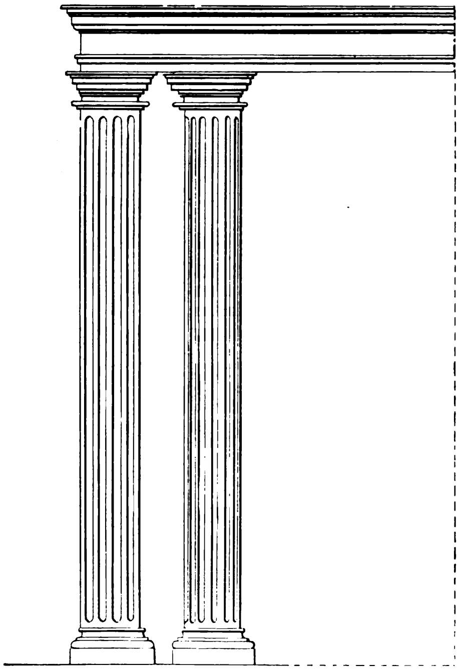
The materials used for division walls or partitions should receive as careful attention as the outer walls. A frame partition lacks the quality of being fireproof, but is the one most commonly used because of its cheapness, being but 11 cents per square foot. A brick partition is not very desirable because it requires an unusually heavy wall, which cannot rest on the floor unless it is supported by a firm foundation. This must either be solid walls or intermediate supports, thereby incurring an additional expense. Such a partition, exclusive of its supports, costs 20 cents per square foot. The partition is the cheapest as regarding the cost of material, but as additional provisions are required for carrying its load the cost may be considered as being the same as a frame partition. The brick partition will be excluded as being undesirable, therefore the choice will be limited to either the frame or tile partition. The fact of the tile partition possessing the quality of being deafening, fireproof and durable, makes it the one which is more worthy our choice.

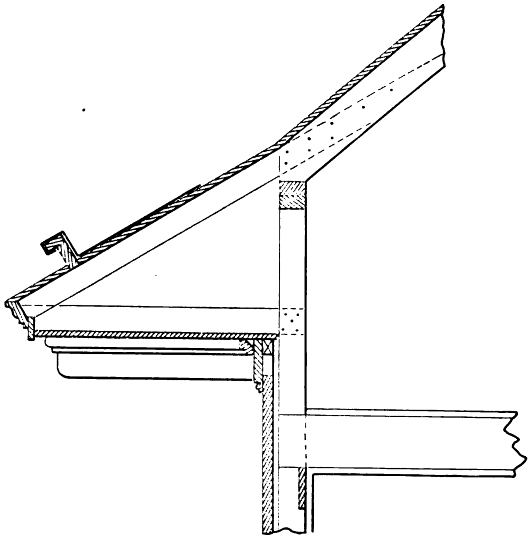
Now, having established our comparison between a frame and brick structure as to actual cost (a difference of $363 on a $4,000 house complete), it will be seen the former is slightly favored. In ten years' time the difference in cost which exists between the frame and brick structure will be entirely eliminated and the cost of both

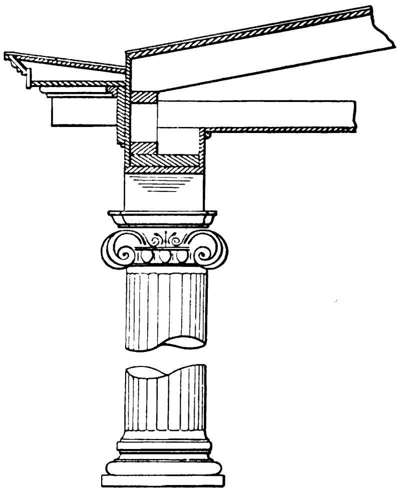
will have been the same, as the repairs, painting and insurance considered will almost amount to the difference. The repairs and painting will alone be about $40 per year after the first three years, and the insurance has a higher premium on combustible structures.

The appearance which a brick house presents at the end of a long number of years is most gratifying, standing as erect and perfect as on the day of its erection, having caused the owner at no time the trouble and expense a frame house would have made. A prominent contractor, who has in his long business career experienced all the difficulties of different constructions, seems to have solved, at least so far as his interests are immediately concerned, the question of the choice of materials. He says, "I will never again make the mistake of building myself a frame structure. My new home shall be of brick facing, with tile backing, as I am positive the results will be more satisfactory and my expenses much less."


Detail of Dormer Cornice.—Scale, ½ Inch to the Foot.


Detail of Opening Between Parlor and Hall.—Scale, ½ Inch to the Foot.


Detail of Main Cornice.—Scale, ½ Inch to the Foot.


Detail of Veranda Cornice.—Scale, ½ Inch to the Foot.

Miscellaneous Constructive Details of Cement Coated Residence with Hollow Block Foundations.

The life of frame construction is doomed, for when our great timber tracts are consumed, where shall we look for lumber? It is not so with brick, for just as long as there remains an earth, just so long will there be sand and clay with which to produce brick, and the supply at no time will be in any great danger of exhaustion.

A Strictly Fireproof Warehouse.

What is said to be the first strictly fireproof building erected in the city of Pittsburgh, Pa., is the eight-story warehouse covering an area 60 x 80 feet and now in process of erection at First avenue and Cherry alley. It will be built entirely of iron and reinforced concrete. All floors, frames and sash will be of metal, and the windows will be glazed with wired plate glass. The structure will be equipped with two freight elevators and one passenger elevator operated by electricity. All curtain walls will be of pressed brick with terra cotta trimmings. The construction will be such as to enable very heavy loads to be carried on the floors, the figures given being 1200 pounds per square foot. The work is to be absolutely fireproof from basement to roof, no woodwork of any kind being in the building. The Nicola Building Company are the general contractors, and the work will be supervised by the W. G. Wilkins Company, architects and engineers, who designed the structure.

STEEL STRUCTURES IN THE SAN FRANCISCO DISASTER.

Effects of Fire, Dynamite and Earthquake Upon the Skyscraper, the Only Surviving Type of Building—Excellent Performance of the Steel Skeleton Frame When Protected by Good Fireproofing—Concrete Floors Withstood the Ordeal—Reinforced Concrete Walls Fastened to Steel Frames Advocated.

By George Simpson.*

It is still too early to get exact information as to how the steel structures of San Francisco stood the earthquake and fire, on account of the immense amount of *débris* which has to be cleared away before all parts of the structure can be examined. But enough is now evident to give a very fair idea as to what happened and how the various classes of structures stood the test.

Fig. 1.—The $7,000,000 City Hall and Hall of Records.

Totally wrecked by earthquake and fire. The building was three stories high, built of common brick faced with cement to resemble stone. Excepting underneath the 330-foot tower and dome the building was wall bearing.

The effects of the earthquake on frame structures are principally shown by fallen chimneys and cracked plaster. The character of the workmanship on these buildings stands out very plainly in the way in which they have stood the test. Good material and workmanship have been but very little damaged, whereas poor material and workmanship have crumbled and fallen beneath the shakes. A number of frame structures have fallen, but they all show that they have been "skinned" in every way. Almost all the chimneys in frame structures have been laid up in lime and mortar, and this class of material is entirely inadequate to withstand the racking caused by the earthquake, with the result that a very large proportion of houses had their chimneys thrown down. This is also true of small brick buildings. The results show that this class of buildings has been more badly damaged than any other class, the weak bond between the mortar and the brick work allowing the walls easily to disintegrate. A great many of the cheaper hotels were built of brick walls, laid up in lime mortar, and wooden beams resting on the walls. It was in these buildings that the effects of the earthquake were most disastrous, shaking them down while the rooms were occupied; and it is probable that in such buildings the greatest loss of life occurred.

Brick walls laid up in Portland cement mortar, with the floor beams properly anchored into them, would probably withstand the shock of an earthquake. This is shown by the condition of the Pacific Hotel, the walls of which were standing intact, although they had been subjected to the shocks of the earthquake and the fierce fire which had raged in the building, burning out every other part of the structure.

Steel Frames Not Damaged by Earthquake.

The effect of the earthquake on the steel structures speaks well for the construction of these buildings in San Francisco. So far as the writer was able to learn, not one of the steel frames was damaged by the earthquake, although the buildings must have been pretty well racked by the shocks. This is shown by the cracks in the piers

---

* Mr. Simpson, who is the chief engineer of the Thompson-Starrett Company, construction engineers, New York, went to the ruined city immediately after the great catastrophe, remaining there several weeks examining the remains of the most important structures.

between windows, and in the condition of the brick, stone and terra cotta fronts. There is scarcely any building in the city which has not some crack of this sort, resulting from the earthquake. It is probable also that the plaster has been thrown down in these buildings, and that the fireproofing, especially terra cotta, has been cracked; but the evidence of this has been entirely destroyed by the fire. Wherever there were evidences of the earthquake on the streets it did not seem to affect the foundations of a building. The street at the southwest corner of the post office has sunk 5 or 6 feet; but this corner of the building does not seem to have settled at all. This is also true of the street in front of the City Hall. Both these buildings were built over the bed of an old stream and had piling for their foundations.

Several suggestions have been made as to building earthquake proof buildings, but there seems to be no need of changing the method of constructing the foundations and the steel frames. Greater care ought to be taken in building the walls of such buildings and in anchoring them to the framework. There is no question but that reinforced concrete walls would be the best construction as the reinforcing steel could be fastened to the steel frame.

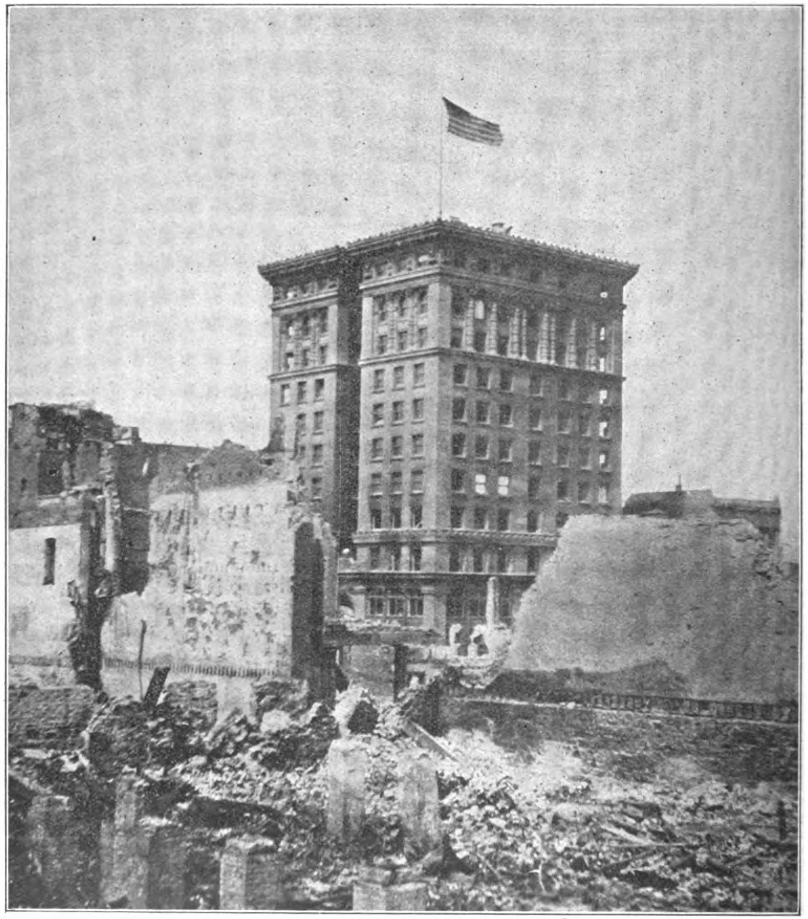


Fig. 2.—Kohl Building.

The only office building in which the offices were not entirely cleaned out by fire. Several of the upper floors were saved completely with their contents. The building had concrete floors and steel trim, with metal window frames, but wooden sash.

Damage by Dynamite and Fire.

A great deal of damage was done to fireproof buildings in San Francisco by the use of dynamite—a damage that to-day seems to have been needless. The Monadnock Building had one charge of dynamite exploded in the basement, which tore out two floors and probably did a great deal of damage to the walls, a damage which might have been attributed to the earthquake. This is also true of the Kamm and Rialto Buildings. The damage from the earthquake, although a very large total in itself, was relatively small in comparison with the damage caused by fire.

A large proportion of the buildings in San Francisco being of wood, the wreck was most complete, the fire being so intense that the sites of former wooden structures have now but a few pieces of charred wood and some bent pipes to show that they were ever occupied. Small brick nonfireproof buildings were also razed to the ground, with here and there a chimney standing and an occasional grate with a gas log in it uninjured.

Near the business part of the city, where the buildings were larger and better built, the walls stood better. All wooden floors were entirely cleaned out, and wherever steel columns and girders were used the whole is a great mass of twisted steel. The falling walls left balanced in the air many curious things. In one case, four beams cantilever 20 feet out from a 16-inch wall, without any support except the anchorage they have in the wall; in the City Hall, a great entablature is balanced on two columns; there are many cases of the lower part of a wall falling out while the upper part is arched between two piers.

As a rule the fireproof buildings of the city are standing, in a state of more or less destruction. In only one building are there any offices left untouched by the fire. This building had cement floors and steel trim, thus reducing the amount of inflammable material in it, and this one example shows that it is possible to make a building

so that its contents will not be destroyed, even in the midst of a fierce fire. There are evidences in other buildings that if there had been less material to burn in them the destruction to the building would have been less; that is, the loss from outside fire was small in comparison with that resulting from the fire produced by the material in the building itself.

Fig. 3.—Crocker Building.

The outside walls, which were self supporting, withstood the fire and earthquake better than other parts of the building. Broken terra cotta floor arches are shown in Fig. 23, and the ruins of the top floor, due to the burning of the wooden roof, are shown in Fig. 34.

Fig. 4.—Mills Building.

This was a wall bearing structure, with steel frame sustaining terra cotta floor arches. Column coverings and partitions were also of terra cotta. Failure of the partitions is shown in Fig. 22. Twisted and buckled steel columns due to the failure of the fireproofing are shown in Figs. 24 and 27.

Performance of Different Fireproofings.

The fire tested thoroughly the various methods of fireproofing steel structures. Concrete stood the test well, there being little or no damage to any steel work which was fireproofed with concrete, while terra cotta was torn off and destroyed in almost every case. When terra cotta was used the partitions fell down, the fireproofing around

Fig. 5.—St. Francis Hotel.

The concrete floor construction of this building remained undamaged. Terra cotta partitions and column coverings also withstood the fire better than in other buildings, due to good workmanship. Two steel columns were badly buckled, as shown in Fig. 25, but they were not amply protected.

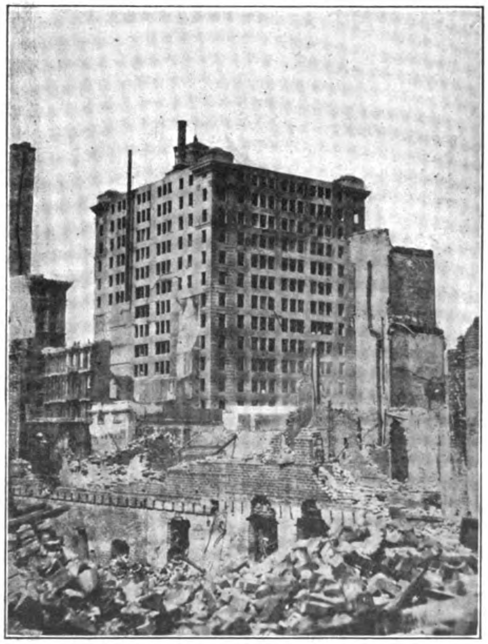


Fig. 6.—Merchants' Exchange Building.

In this building the best method of column covering employed in San Francisco was demonstrated. Wire lath and plaster in two thicknesses, with an air space between, was used. The concrete floor construction was not damaged. The building was subjected to a most severe test, which it withstood well.

the columns came off, and a very large proportion of the floor arches either fell out, or the bottom plates of the arches broke off and left the arches in very bad shape.

Columns.—In the great majority of cases the fireproofing of columns was of terra cotta. Very often concrete arches were used, but the partitions and column covering were terra cotta. The result of this destruction of column covering was that there are very few buildings in the city in which there are no columns bent by fire. These bends are usually at the ceiling. It is evident that the flames rising to the ceiling travelled along it until they reached some shaft which formed a flue, and any column in their path was buckled. The form of column covering that seems to have stood most successfully was two thicknesses of wire lath and plaster, with an air space between them. In a number of cases the outside covering was torn off, but it seems to have resisted the fire during the time it was most intense, sufficiently so to allow the inner covering to protect the column.

Ceilings.—Hung ceilings seem to have been very successful in withstanding the fire. These ceilings did excellent service, especially in preventing the fire from reaching the floor arches above them. In the Merchants' Exchange Building, where the heat must have been very intense, there are only a few patches of hung ceiling broken. A number of rooms in this building were used for filing records, and in one such room the ashes of the papers are about two feet deep. The fire that caused this must have produced an intense heat, but the ceiling, while it will have to be replaced, did not break, and successfully prevented the fire from getting at the beams above.

Fig. 7.—Old Chronicle Building.

At the time of its erection, in 1888, this building was made as nearly fireproof and as safe against earthquakes as the practice of that time permitted. It was the first building of the "skyscraper" type built in San Francisco. The floors fell to the basement, as shown in Fig. 32. A broken cast iron column and broken steel I-beams are shown in Figs. 29 and 30.

Fig. 8.—New Chronicle Building.

As this building, which adjoins the older building of the same name, was unfinished and unoccupied, no damage was done to it save a little shaking of the front piers by the earthquake. The steel skeleton frame is intact and uninjured. Where there was woodwork in the building to burn the terra cotta floor arches chipped off as in the other buildings.

Partitions.—There did not seem to be any partitions which successfully withstood the fire in San Francisco. Terra cotta was very badly damaged and wire lath and plaster became very much bent and warped, owing to the twisting of the steel in their construction. The windows between the halls and the offices also proved to be a very bad thing, as they were easily burned out, adding to the fire, and the flames quickly passed from room to room through the openings thus made.

Fronts.—All the material used in the fronts of the buildings was more or less damaged, stone, of course, showing the worst effects. The granite columns in the first story of the Postal Telegraph Company Building have almost entirely disappeared, through the splitting of the stone. This is true of every place where the flames or heat touched the stone; it spalled off and left the fronts in such bad condition that they will probably have to be taken down. Brick work was also very badly cracked by the heat. Terra cotta did not act very much better than stone. One building on Sutter street, near Montgomery, which was almost entirely of terra cotta, is very badly wrecked. Wireglass seems to have stood the test up to the melting point of the glass. The heat was so intense that glass soon melted and fell out, and quantities of it, in this state, can be seen in the ruins. Wooden floors and sleepers were cleanly burned out; in most cases no evidences of the floors were left, and the only trace of the sleepers is a channel in the concrete filling of the floors. The effect of the heat on terra cotta made it brittle, so that it can easily be broken with the fingers, and the unequal expansion due to the face toward the flame being hotter than that away from it caused the plate toward the flame to crack and fall off.

The Buildings.

The following is a summary of the writer's observations on a number of fireproof buildings in San Francisco. In the description of the buildings unless otherwise described they have skeleton frames with steel columns:

City Hall and Hall of Records.

This building is three stories in hight and built of common brick faced with cement, marked off to resemble stone. The main portion is surmounted by a tower and dome some 330 feet high. The outside walls are bearing walls; the interior of the tower and dome is supported on steel, the outside walls being self supporting up to the under side of the dome. The building was commenced in 1871, took a number of years to complete and cost $7,000,000.

The earthquake threw down almost the entire wall on City Hall avenue, also the greater part of the self supporting walls of the tower. The Hall of Records was very little damaged by the earthquake. The columns in the main entrance were immense hollow cast iron columns filled with brick concrete, and these in falling broke into sections. The round columns at the corner of City Hall

Fig. 9.—Fairmount Hotel.

Although this building was scarcely completed and unoccupied, the damage done by fire was very considerable. The wire lath partitions and column coverings failed completely and the entire interior of the building was badly gutted. The handsome stone and glazed terra cotta front of the building was badly spalled and smoked. There was no perceptible damage by earthquake. On the left of the picture the ruins of the James Flood residence are shown.

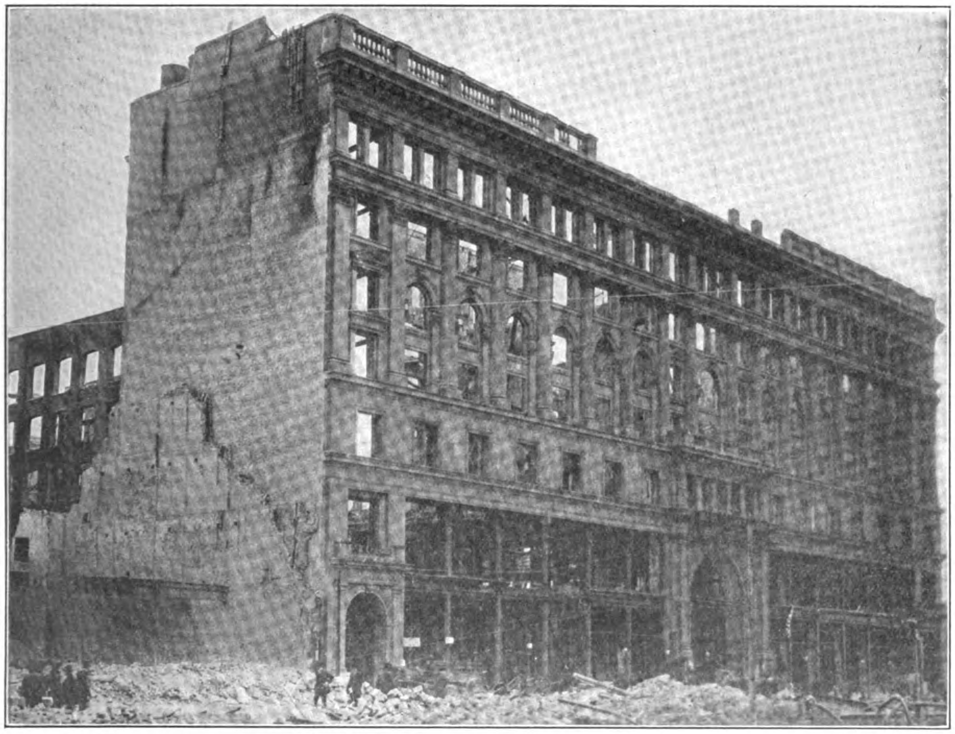


Fig. 10.—The Emporium.

Having been used as one of San Francisco's largest department stores and being laden with inflammable materials, this building was easy prey for the flames. Much damage was done by dynamite, the fireproofing of the first and second floors being rendered useless thereby. The effect upon the steel columns and girders of the upper floors, which were nonfireproof, is apparent.

avenue and Larkin street stood, supporting the entablature on top of them. The building seems to be a complete wreck as a result of earthquake. The fire got into it, and although very little trace of it can be seen on the outside of the building, the probabilities are that the interior was entirely burned out. It was impossible to get admission to this building.

Kohl Building.

Northeast corner of Montgomery and California streets.
Illustration, Fig. 2.
Eleven stories.
Material of front: Sandstone.
Concrete floor construction.
Column covering and partitions, wire lath and plaster; column covering, double.
Hung ceilings.
Finished cement floors and trim, throughout the building, steel.
Window frames were of metal, but sash was wood.

The effect of the earthquake was very slight. A few cracks appeared in the outside walls, and inside the principal evidence of damage from this source was the shaking loose of the marble wainscoting. The first floor was left in fair condition by the fire. The second and third floors were pretty well burned out. The fourth, fifth and sixth floors were slightly burned, but from there to the roof there was practically no damage from the fire. The flames damaged the stone front, especially the front on California street, where the heat was most intense. The fire outside this building must have been quite as severe as the average; the buildings all around it being burned very badly, with the exception of the one on the east side, which was a low bank building and probably protected the Kohl Building somewhat. During the entire fire two or three men remained in this building and did what they could to put out the flames; but the result of their efforts must have been slight, as they had to carry in pails the water they used to extinguish the fire. This is the only building within the fire zone in San Francisco which had any of the interior left, and it seems to show the methods which should be employed in making a building fireproof, the main thing to be borne in mind being the reduction to a minimum of all inflammable material. The fire did not get into the basement of the Kohl Building at all; consequently, the power plant was uninjured, and elevators were running in two weeks after the earthquake.

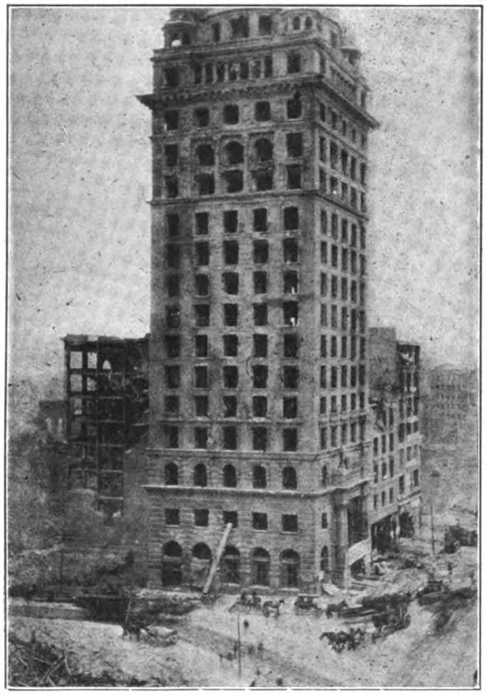


Fig. 11.—Call Building.

Showing the Third street side, where the fire was fiercest and where the stone work is badly damaged. A report which it was impossible to confirm states that the building is out of plumb. The concrete floor construction, which was of the bottom flange system, stood the fire test well.

Crocker Building.

Corner of Market and Post streets.
Illustration, Fig. 3.
Ten stories.
Front: Stone, brick and terra cotta.
Floor construction, column covering, partitions: Terra cotta.

The roof of this building was constructed of wood, which soon burned out, leaving the top story a chaotic mass of beams, wire lath and fireproofing. The partitions throughout the building fell down, the covering parted from the columns, and the floor arches, although they did not fall out to any great extent, the bottom plates cracked and fell. With the exception of the roof no steel seems to have been damaged, which is very surprising, considering the condition of the fireproofing.

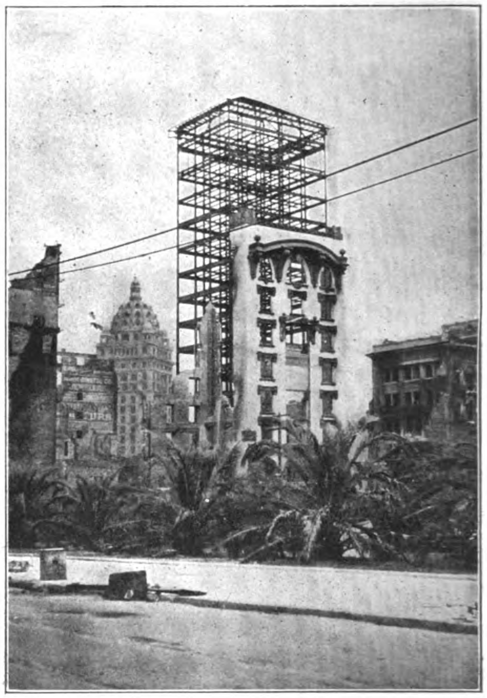


Fig. 12.—Whittell Building.

The bare steel skeleton shown in the middle of the engraving is the only work completed on this building, which was in course of construction at the time of the disaster. The original plan of inclosing the building in steel plates will doubtless be changed, owing to the lessons of the great fire.

The construction of the building was not of the skeleton type, the outside walls being self supporting, the steel frame only sustaining the floors. The outside walls are very heavy, and seem to be specially well built; they sustain little damage from the earthquake and fire.

Mills Building

Corner of Montgomery and Bush streets.
Illustration, Fig. 4.
Ten stories.
Material of front: Marble, brick and terra cotta.
Floor construction, column covering and partitions: Terra cotta.

This building was not of the skeleton construction type, the outside walls being self supporting, and the steel frame only sustaining the floors. The earthquake slightly cracked some of the walls. The fire cleaned the inside of the building out from the basement to the roof, with the exception of the engine room. The fireproofing was torn from the columns, the partitions crumbled away (see Fig. 22), the floor arches fell out in a number of places, and in a great many other cases the bottom plate of the arch cracked and fell off. Three columns in the basement were buckled, one of them very badly (see

Fig. 13.—Monadnock Building.

Pacific Hotel on one side and Call Building on the other side of it. This building would not have **been very seriously damaged** had it not been for the **great amount** of unnecessary dynamiting done to **it. Details of the damage are shown in Figs. 31 and 26.**

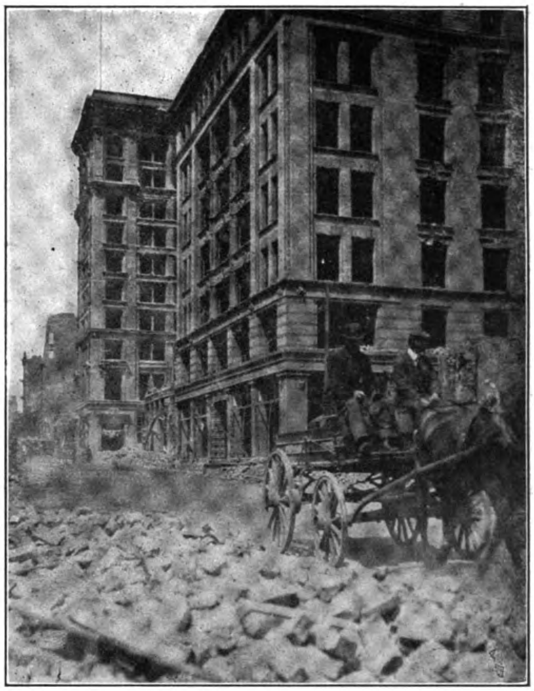


Fig. 15.—Sloane Building.

One of the few examples of the failure of cast iron columns in the fire is furnished by this building. Being used as a furniture store, it was filled with highly imflammable material, and the fire was very intense. Practically the entire interior of the structure sunk several feet. It was also affected by earthquake.

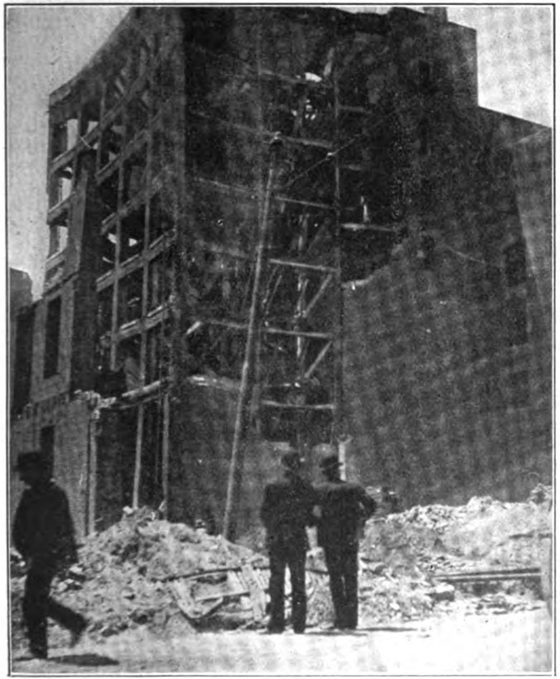


Fig. 14.—Kamm Building.

Another illustration of the extensive damage wrought by **dynamiting is afforded** by this building. It is a total wreck, **owing to the extensive** destruction due to dynamiting. The **steel columns are** mostly all standing, but they are buckled, and **the floors have been** torn loose and are hanging from the **columns.**

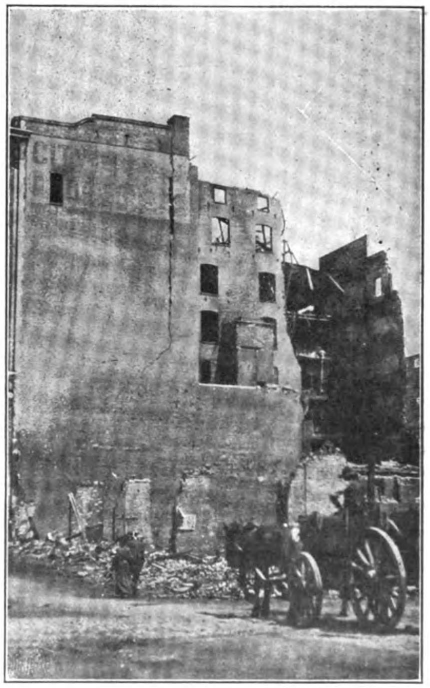


Fig. 16.—City of Paris Dry Goods Company Building.

The principal damage here was also done by dynamite. The southeast corner of the building, which was dynamited, was entirely destroyed, and in this section alone is the framework badly damaged. The fire did its worst work in the two lower stories.

Fig. 27). The interior court was built with glazed brick and cast iron mullions. The glazing peeled off the bricks and the mullions bent badly.

The heat in the basement was very intense, the sidewalk beams are badly bent, the sidewalk in places presenting the appearance of waves.

With the exception of the damage done to the stone by the fire the front walls seem to be in good condition.

St. Francis Hotel.

Union Square, corner of Geary and Powell streets.
Illustration, Fig. 5.
Twelve stories.
Front: Stone.
Floor construction: Concrete.
Partitions and column covering: Terra cotta.
Hung ceilings.

The floor construction was undamaged. The partitions and column covering in this building were not so seriously affected as in the great number of other cases where terra cotta was employed for these purposes. The fire reached two columns in the mezzanine story and buckled them (see Fig. 25); otherwise there was no damage to the steel work. The court was lined with pressed brick, which had but very little bond with the common brick backing, and this lining was either shaken off by the earthquake or destroyed by exposure to the fire.

The front, although well blackened by the smoke, was not much damaged by the fire. The extension to the building, for which the steel frame was almost complete, was but little damaged, and few beams and one column were bent. Any evidences of earthquake were very largely covered up by the fire damage. The stone piers in the front and some brick piers inside are cracked.

Fig. 17.—Hibernia Bank Building.

A typical illustration of the condition of this type of building. The interior was badly gutted by fire and the stone work considerably damaged.

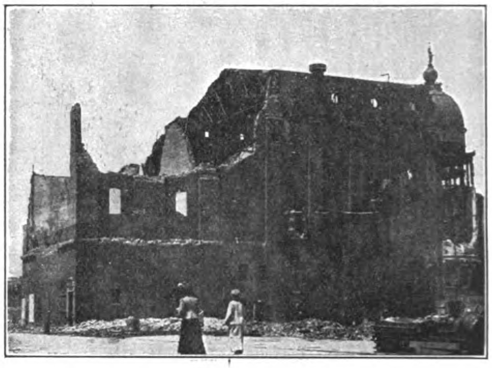


Fig. 19.—Majestic Theater.

Damaged by earthquake. The stage end, which was unsupported brick work, collapsed completely, while the steel frame of the forward portion remained standing.

Fig. 18.—Aronson Building.

Seriously damaged by fire, dynamiting and earthquake, this building presents a sorry picture and is in a dangerous condition. An interior view showing buckled columns and fallen partitions, but undamaged concrete floors, is shown in Fig. 28.

Merchants' Exchange Building.

California street near Montgomery street.
Illustration, Fig. 6.
Fourteen stories.
Material of front: Stone, brick and terra cotta.
Floor construction: Concrete.
Column covering: Two thicknesses of wire lath and plaster, with air space between.
Partitions: Wire lath and plaster.
Hung ceilings.

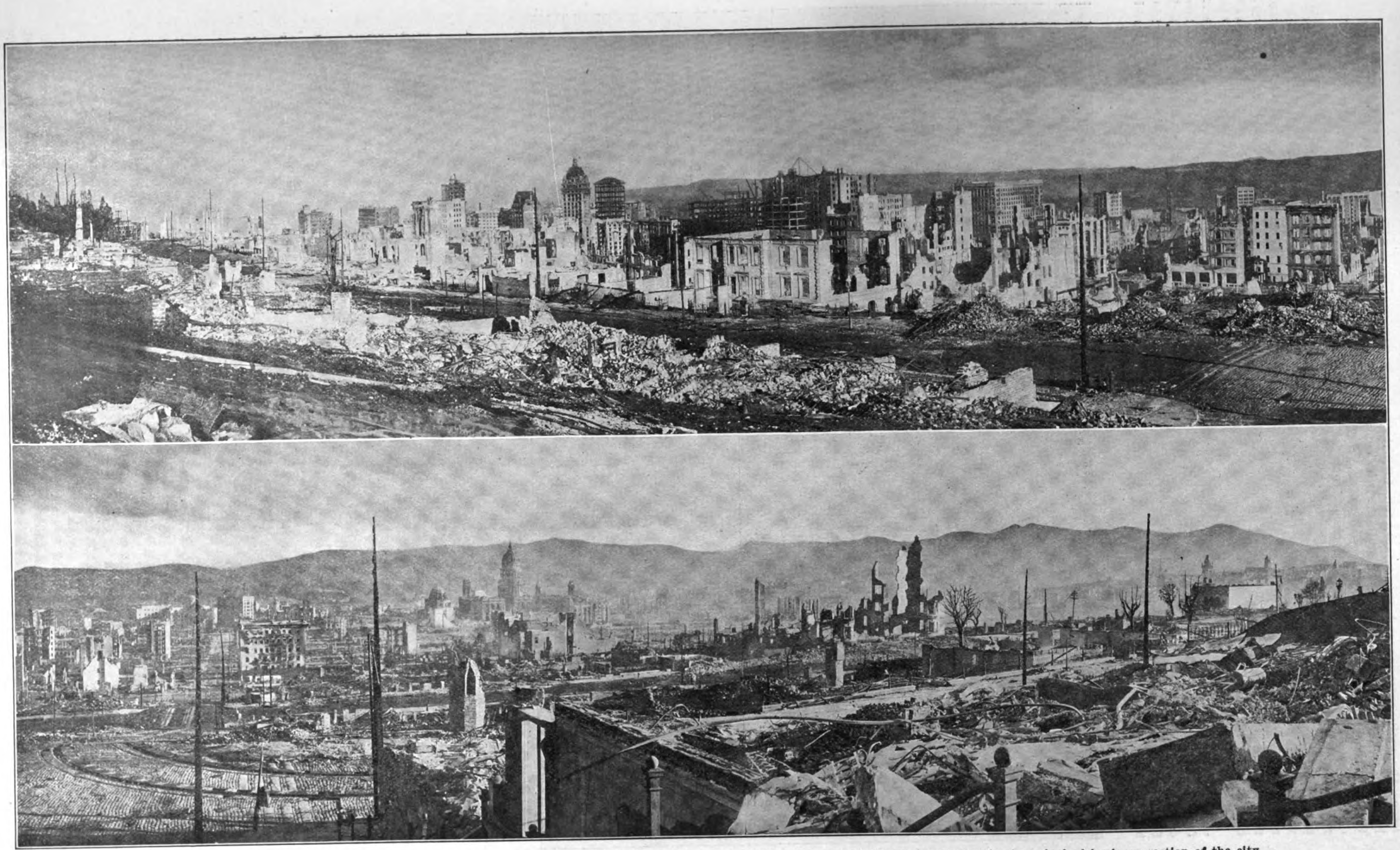
The method of fireproofing the columns in this building stood the fire well. In a number of cases the outside thickness of wire lath and plaster was torn off, but the inner thickness held, with the result that no columns in the building were affected by the fire. This method of fireproofing columns was the most successful of any employed in San Francisco. There is no question that the air space between the two thicknesses of wire lath and plaster contributed to this good result, but it looks very much as if the outside thickness broke the force of the heat and the inner covering was capable of withstanding the amount of heat which reached it. No damage was done to the floor construction, the hung ceiling underneath preventing the flames from reaching it. This ceiling was broken only in a few places. The partitions were very badly twisted out of shape, as were all partitions of this kind subjected to the fire.

The earthquake probably cracked the walls, but a great deal of damage was done to them by the fire, and it is very difficult to arrive at any conclusion as to the relative proportions of the damage resulting from these causes. Both the brick and stone work of the front were damaged. Hung ceilings and the concrete floor thoroughly protected the beams, and there seems to be no damaged steel in the building at all. The fire did not reach the basement, thus leaving the power plant intact. Elevators were running in two weeks after the earthquake. The court walls were laid up in glazed brick. The glazing peeled off in patches, and generally this court wall was in bad shape.

Chronicle Building.

Corner Kearny and Market streets.
Illustration, Fig. 7.
Ten stories.
Front: Stone, brick and terra cotta.
Floor construction, column covering and partitions: Terra cotta.

This building is not a skeleton construction, the outside walls being self supporting, with columns built in them to carry the floors. The columns throughout this building are cast iron. All the floors in the building, be-



Figs. 20 and 21.—These two views placed end to end form a panoramic view taken from Nob Hill and show the extent of the devastation in the principal business section of the city.

tween the main entrance and the corner, fell into the basement. There were tenants in this building who continued to occupy their offices until the evening of the day of the earthquake, consequently these floors did not fall from the effects of the earthquake. There was quite an amount of machinery in the top story, the weight of which probably started the top floor to fall, and it carried the rest of the floors with it. There was a fire in this building November last, which carried away the clock tower.

The terra cotta partitions and column covering crumbled and fell, and the terra cotta arches broke and fell in a large number of cases. None of the steel work was damaged, except that in the section of the building which fell. A column in the top story was broken off about the middle (Fig. 30), and two beams supporting a bay window on Kearny street were broken at the wall, where some separator holes had been punched, the ends of the beams hanging down alongside the walls and held by a small amount of metal in the bottom flanges (Fig. 29).

Fig. 22.—Ruins in the Mills Building.

Showing the failure of terra cotta partitions. Similar views were numerous throughout the tall buildings of the city.

The new part of the Chronicle Building (Fig. 8) was unfinished and unoccupied. There was, therefore, no damage done to it beyond a little shaking of the front piers by the earthquake. In one or two stories where there was some wood work to burn the bottoms of the terra cotta arches spalled off, as they did in all other buildings where they were exposed to the fire.

Fairmount Hotel.

Nob Hill.

Illustration, Fig. 9.
Five stories.
Front: Stone and glazed terra cotta.
Floor construction: Concrete.
Column covering and partitions: Wire lath and plaster.

This building was not yet occupied, but the greater part of the building was ready for occupancy, and, no doubt, if this fire had not happened the hotel would have been open for guests within a short time. There did not seem to be any effect by earthquake. The fire cleaned the building out very thoroughly, damaging the interior to a great extent. The stone of the front was badly spalled by the fire and the terra cotta was blacked by the smoke.

Emporium.

Market street.

Illustration, Fig. 10.
Seven stories.
Front: Stone.
First and second stories fireproofed.
Floor construction and column covering: Terra cotta.

At present all that remains of this building is an ugly pile of twisted steel. The fire seems to have burned out the structure very completely, but it would probably have been less of a ruin had it not been dynamited. There is no way of telling whether the earthquake had any effect, but it probably had little beyond a few cracks in the walls. The upper stories were not fireproof, but had steel columns and girders. The effect of the fire on this form of construction was evident in the twisting and bending of the steel.

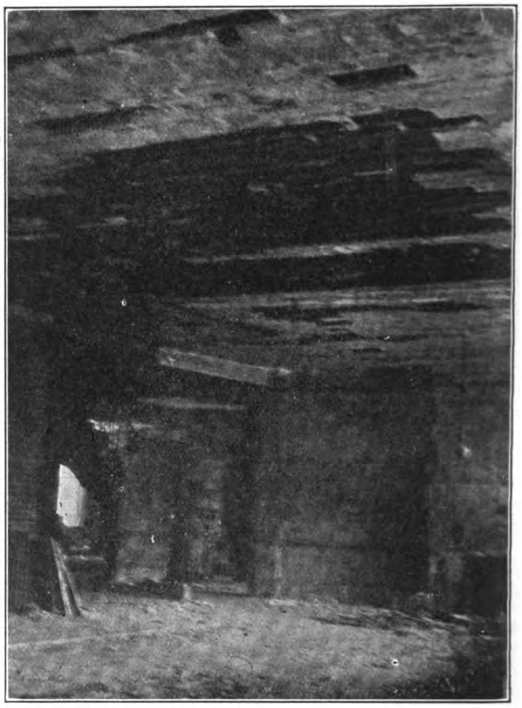


Fig. 23.—View in the Crocker Building.

A typical illustration of the manner in which the bottom plates of the terra cotta arches spalled off.

Call Building.

Corner of Third and Market streets.

Illustration, Fig. 11.
Nineteen stories.
Front: Sandstone.
Floor construction: Concrete.
Partitions and column covering: Terra cotta.

It was reported that this building was out of plumb, but this was not evident to the eye, and at the time of writing no one was allowed in the building to make an examination of it. The partitions and column covering throughout the building were very badly damaged. The floor construction was the bottom flange system, and, so far as the writer could see, stood the fire test well. The flames on the east side of the building were the fiercest, and therefore the stone work on this side of the building was very badly damaged.

It would be hard to say how extensive the damage from the earthquake was because of the serious damage by fire, but it is not likely that it was very much.

Whittell Building.

Illustration, Fig. 12.
Fifteen stories.

The steel work of this building had just been completed, and none of the other work had been started. Flames from the adjacent buildings bent a few of the

beams in the first and second stories; but, with these exceptions, the frame work stands just as it was before the earthquake and fire. It was reported that the owner of this building intended to inclose it in steel plates, with the object of making it earthquake proof. It is needless to say that, while this might make the building capable of resisting the effects of earthquakes, it would not render it fireproof, and, as most of the destruction in San Fran-

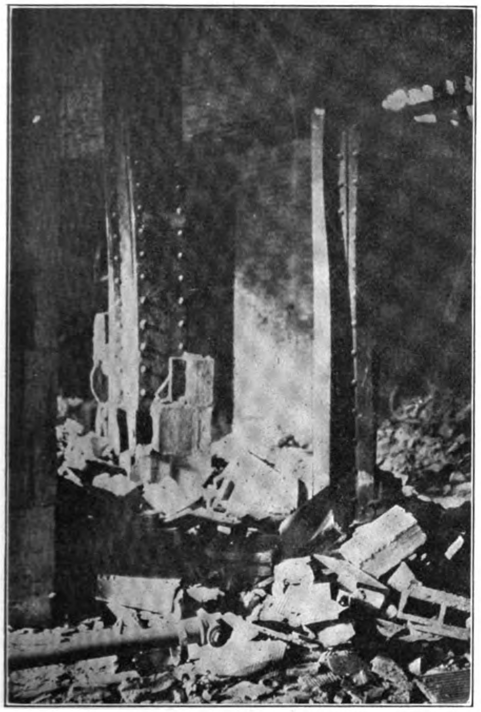


Fig. 24.—Twisted Columns in the Mills Building.

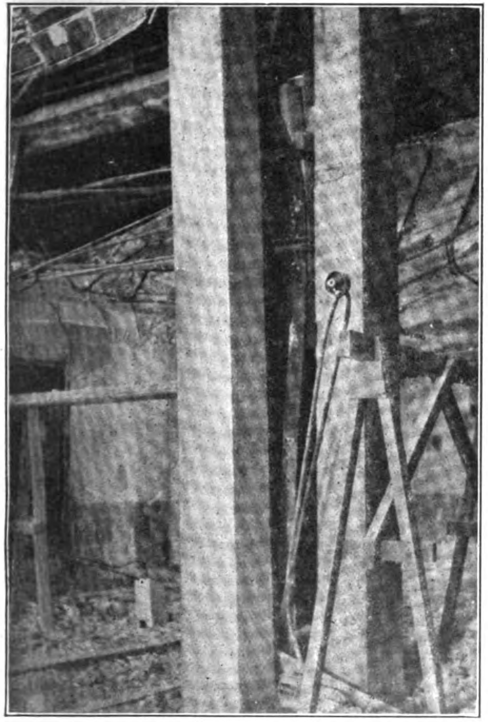


Fig. 25.—Warped column in the St. Francis Hotel. Two of these columns acting in this manner had not been amply protected by fireproofing.

Fig. 26.—Buckled Columns in the Monadnock Building.

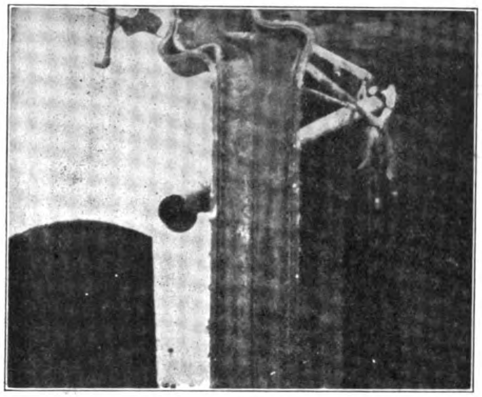


Fig. 27.—Buckled Column in the Mills Building.

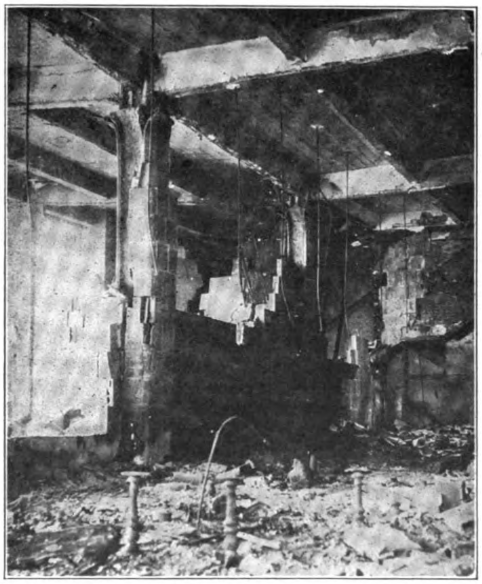


Fig. 28.—View in the Aronson Building showing buckled columns due to broken terra cotta coverings, while concrete floors resisted the fire.

Twisted and Buckled Steel Columns.

cisco was caused by the fire, it would be far better in finishing the building to follow the usual, approved methods of fireproofing the steel.

As will be noted in Fig. 12, the entire erection of the steel work of this building was completed without putting in any of the floor arches.

Monadnock Building.

Market and Annie streets.
Illustration, Fig. 13.
Ten stories.
Front: Stone and brick.
Floor construction: Steel girders, concrete beams and floor slabs.
Partitions and column covering: Wire lath and plaster.

This building was not completed when the earthquake and fire happened; consequently the fire did little damage to it. Parts of the building have been dynamited, and it is difficult to determine whether the cracks in the walls are due to dynamite or to earthquake. The walls on Market street are quite badly cracked, and at the corner of Annie and Market streets the side on Annie street shows a large crack, practically from the roof down. Some of the wall on Annie street, at the rear of the building, has fallen out. No such serious damage has been done to any building by the earthquake, and there is no question that this damage is largely due to dynamite. One charge of dynamite, placed in the basement, blew out arches in the first and second floors and struck the ceiling of the second story, breaking the wire lath. The Hearst Building, next door, was dynamited after the fire, and this also must have injuriously affected the Monadnock Building. As the building was in an unfinished state, all the columns were not fireproofed; and in the basement, where there was an intense heat, due to the burning of a large quantity of lumber, two of the columns buckled, as shown in Fig. 26.

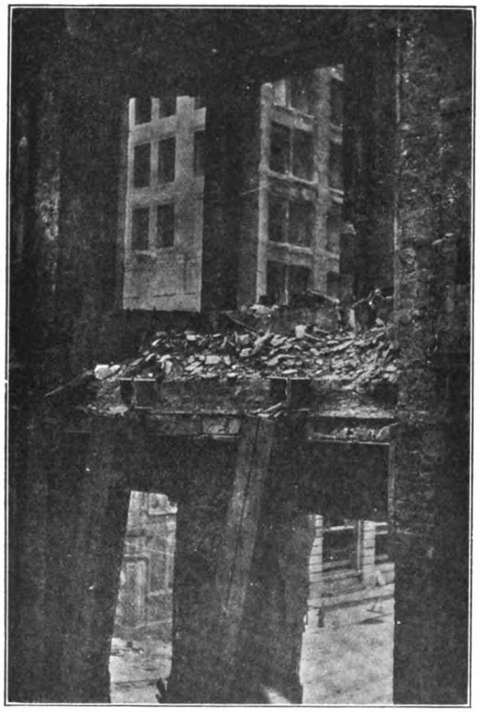


Fig. 29.—View in old Chronicle Building showing steel I-beams broken off at separator holes near their ends.

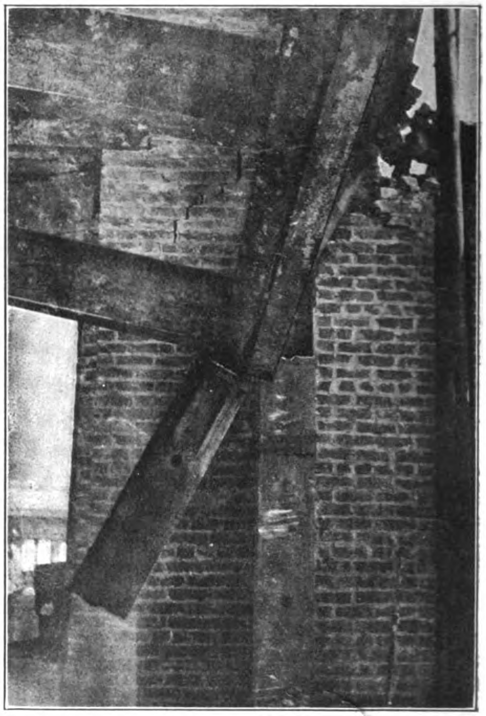


Fig. 30.—View in old Chronicle Building. A cast iron column located in the top story broken off about midway.

Kamm Building.

Stevenson street, near Third street.
Illustration, Fig. 14.
Eight stories.
Brick walls.
Floor construction: Concrete.
Column covering and partitions: Wire lath and plaster.

This building was connected with a building on Market street, occupied by a dealer in wall paper, and there was a large stock of wall paper in the basement of the Kamm Building. The building is a total wreck from the use of dynamite. The steel columns are mostly all standing, but they are buckled and the floors have been torn loose and are hanging from the columns. Large sections of the walls have fallen down. Nothing could be learned from this building as to the effects of earthquake and fire, owing to the extensive destruction due to dynamiting.

Sloane Building.

Post street, between Kearney street and Grant avenue.
Illustration, Fig. 15.
Seven stories.
Front: Brick and terra cotta.
Floor construction: Concrete.
Column covering: Terra cotta.
Columns: Cast iron.

This building was used as a furniture store, and was affected by the earthquake, but not to such extent as to make it unserviceable. The front walls were greatly damaged by the fire, so much so that evidences of earthquake were almost completed destroyed. There must have been an intense heat in the building, as it buckled several columns in the basement, and practically the whole interior of the structure sunk several feet. This is one of the few examples of the failure of cast iron columns in the fire. As a rule, this material came through without much damage.

City of Paris Dry Goods Company Building.

Southeast corner of Geary and Stockton streets.
Illustration, Fig. 16.
Six stories.
Front: Stone, brick and terra cotta.
Floor construction, column covering, partitions: Terra cotta.

The front of this building is in very fair condition, the flames having damaged but a small part of the stone work. The terra cotta in the interior of the building has been seriously affected, especially in the lower stories, the partitions being thrown down, the column covering broken off, and the bottom plates of the arches fallen out. The condition of the frame work seems to be pretty fair, with the exception of that in the southeast corner, which was dynamited. The dynamite destroyed this corner of the building thoroughly. There are no evidences of the earthquake, although these may have been destroyed by fire or dynamite. The fire in this building seems to have been

fiercest in the two lower stories, which were occupied by a dry goods company; apparently above these stories the fire could not have been so intense, as the resultant damage was less.

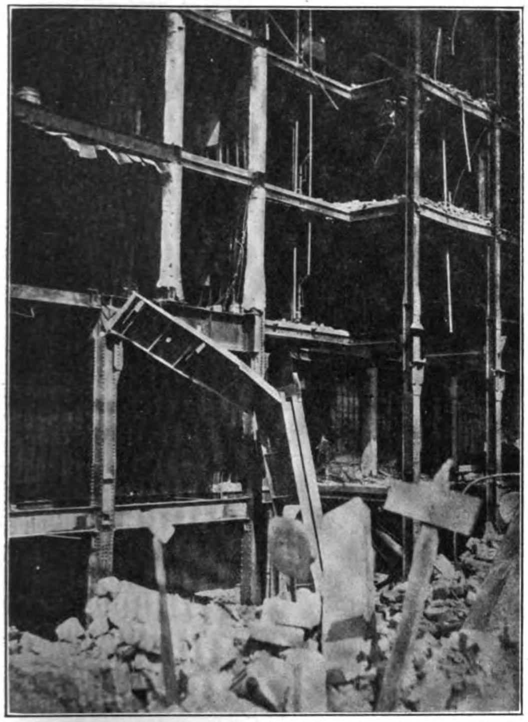


Fig. 31.—West side of Monadnock Building, showing damage due to dynamiting.

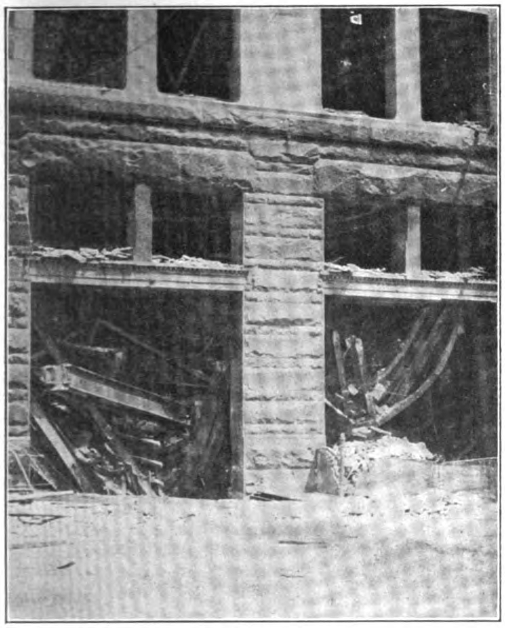


Fig. 32.—Bottom of old Chronicle Building, showing fallen floor beams.

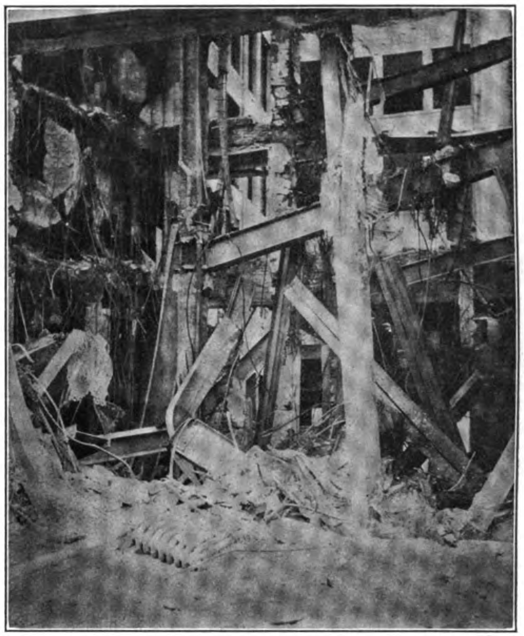


Fig. 33.—Bottom of Rialto Building, showing mass of twisted ruins.

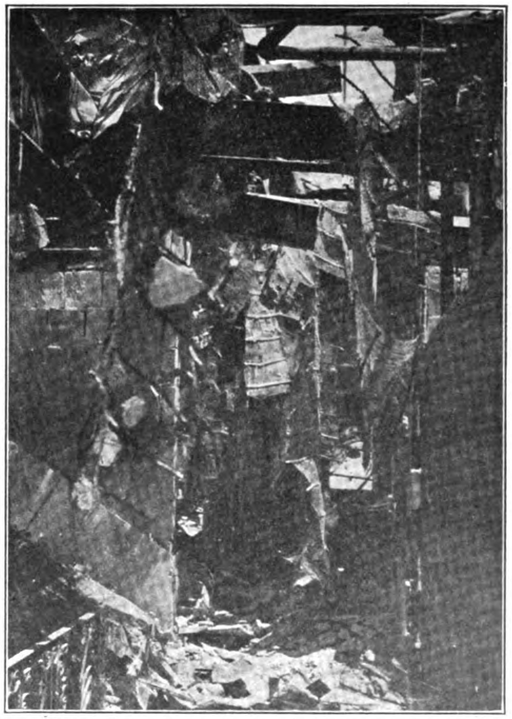


Fig. 34.—Top of Crocker Building. Ruins due to burning of wooden roof.

Aronson Building.

Corner Third and Mission streets.

Illustration, Fig. 18.
Ten stories.
Front: Stone, brick and terra cotta.
Floor construction: Concrete.
Column covering and partitions: Terra cotta.

The front of this building was very badly damaged by fire; also, probably, by earthquake and dynamite. The interior partitions all fell down, and in several cases columns were exposed to the flames, with the result that they buckled, leaving the interior of the building in a dangerous condition. The concrete floors stood, as is shown by the picture of the buckled columns in the building in Fig. 28. There were no hung ceilings; consequently the concrete had to stand the full force of the flames, which it did without any material damage.

Flood Building.

Market street.

Eleven stories.
Front: Stone.
Floor construction: Terra cotta, segmental arches.
Column covering and partitions: Terra cotta.
Hung ceilings.

With the exception of the first story, the hung ceilings protected the terra cotta arches in this building, and they sustained little or no damage. The partitions and column coverings have been all broken and thrown down. Evidently no steel was exposed to the flame, except in the first story, where several columns were slightly bent from heat. The east wall of this building was a very large expanse of solid brick, which was uninjured by the fire. No signs of earthquake appear in this wall. Some of the front piers were cracked, but no serious damage seems to have been occasioned by the earthquake. The building was completely gutted by the fire.

Post Office.

Corner of Seventh and Mission streets.

Three stories.
Front: Stone.

The stone work of this building has been very badly shaken by the earthquake; particularly that on the east side. At the southwest corner the street sunk 5 or 6 feet, allowing the bottom stones of the platform, which extends around the building, to drop away and leave a space of 1 to 2 feet between the platform and the stones beneath. The interior of the building has not been very seriously damaged, the principal effects showing in the marble wainscoting. The mosiac ceilings stood very well. Quite extensive damage to this building must have been occasioned by the use of dynamite. In the second story the corridors are lined with transoms and glass paneled doors, and not a single piece of glass has been left unbroken in these transoms and doors; this is the effect of dynamite. The building suffered but slightly from fire.

Building on north side Sutter street, between Kearny and Montgomery streets.

Eight stories.
Front: Almost entirely of terra cotta.
Floor construction: Concrete.
Partitions and column covering: Terra cotta.

The exterior terra cotta of this building was very badly broken as a result of the fire; so badly that it removed all evidence of possible earthquake damage. In a number of cases the terra cotta had fallen out, leaving the steel exposed in the outside walls, and in such instances the steel was twisted as an effect of the fire. The floor arches held well, as in all other instances of concrete arch construction. The terra cotta partitions and column covering were very badly damaged, and in the case of at least one column the covering permitted the fire to reach the column and buckle it. A panel of arches, through several floors, was torn out, evidently by the falling of some heavy weight.

Rialto Building.

Corner of Mission and New Montgomery streets.

Eight stories.
Front: Brick and terra cotta.
Floor construction: Concrete.
Column covering and partitions: Wire lath and plaster.

It is impossible to determine whether or not the earthquake damaged this building, because of the effects of dynamite. The fire cleaned out the building thoroughly, but it is doubtful that it damaged any of the steel work, for the reason that the fireproofing was of a type that stood the flames well in other buildings. The southeast and northwest corners of the building were dynamited, and these portions of the building are in ruins, the floors from the roof down have fallen into the basement. Columns were buckled, and beams were hanging from them in a tangled masses. One column stood without a lateral support from the first floor to the roof.

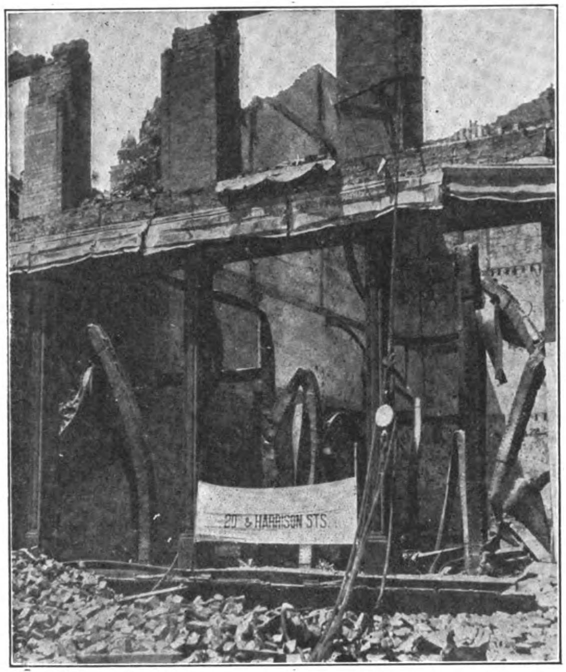


Fig. 35.—Nonfireproofed Wall Bearing Structure on Mission Street, Showing Effect of Heat Upon the Unprotected Steel.

Wells Fargo Building.

Corner of Mission and Second streets.

Six stories.
Front: Stone, brick and terra cotta.
Floor construction: Concrete.
Partitions and column covering: Wire lath and plaster.

The interior of this building was completely burned out. The fire damaged the front to a considerable extent. There were very few cracks from the earthquake. No steel was damaged. The partitions in this building stood the fire well, probably due to the fire not being as fierce as in other buildings. The plaster was destroyed, but with few exceptions the wire lath was in good condition and work had already begun taking the old plaster off in preparation for putting on new. There seemed to have been no damage to the floor arches.

Atlas Building.

Mission street, near Second street.

Ten stories.
Front: Rough brick, with cement finish.
Floor construction: Concrete.
Column covering and partitions: Wire lath and plaster.

This was a new and unoccupied building and the damage from fire was consequently not very large. The walls were cracked, either from dynamite or earthquake; probably from dynamite, as it was used very freely in the vicinity of this building. At the time of writing several tenants are in the building.

Next to this building is standing the only nonfireproof building in the burned district. How it escaped the fire it would be very hard to say, as all the buildings around it, even fireproof buildings, were burned.

Mutual Savings Bank.

Market and Geary, near Kearny streets.

Eleven stories.
Front: Stone.
Floor construction: Concrete.
Column covering and partitions: Wire lath and plaster.

The steel frame appears to be in good condition, but the writer was unable to gain admission to make any kind of an examination. The front on Market street was not much injured, but that on Geary street was ruined. This is due to the fact that the wind was from the south and blew the flames through on the Geary street side. The fire cleaned the interior of the building out very thoroughly, but judging from what could be seen from the outside, the partitions and column covering stood remarkably well.

Union Trust Building.

Corner Montgomery and Market streets.

Ten stories.
Front: Brick, stone and terra cotta.
Floor construction, column covering and partitions: Terra cotta.

The floor arches were broken, the column covering torn off and a large number of the partitions fell down. The fire did not seem to be fierce enough in this building to do any damage to the uncovered steel. The front was in fair shape, although quite a little of the stone work was damaged by the fire. There seemed to be little or no damage from the earthquake.

Shreve Building.

Corner of Post street and Grant avenue.

Ten stories.
Front: Sandstone.
Floor construction: Concrete.
Partitions and column covering: Wire lath and plaster.

There seems to have been little or no effect of the earthquake upon this building. The flames destroyed the front stone work, particularly that of the front on Grant avenue. The contents of the building were burned and the whole interior wrecked. None of the steel in the building appears to have been damaged.

Newman and Levison Building

Southwest corner of Geary and Stockton streets.

The only part of this building in place was the steel frame, which was very nearly completed. About three stories of the stone work had been erected. Very little damage was done to the steel. In places where there was wood it burned out, and, in a number of cases, buckled the beams. This applies only to the lower stories; in the upper, the paint, red lead, is practically unaffected. There were no evidences of earthquake.

Low Bank Buildings.

There are a number of low fireproof bank buildings in the city to which no access could be obtained because of the precautions taken to safeguard the contents of the vaults. Generally the condition of the exterior of such buildings was the same as in the case of the Hibernia Bank, a picture of which is shown in Fig. 17. The fire entered all of them, probably burning up everything combustible inside and producing heat intense enough to destroy the stone work of the exteriors.

◆◆◆

A HIGH CLASS elevator apartment house, arranged for 41 families, is soon to be erected on the northeast corner of Madison avenue and Sixty-sixth street, New York City, in accordance with plans prepared by Architects Harde & Short of West Twenty-ninth street. The building will be ten stories in hight, will cover a plot 100 x 100½ feet, and will cost about $1,000,000. The exterior will be of light brick, limestone, terra cotta and fine ornamental iron work, while the interior will be finished in hard wood, marble, tile and mosaic.

◆◆◆

Egyptian Building.

The architecture of Egypt divides itself into two great periods, the first represented by the pyramids and the second by the temples. All chronological systems, however widely differing in the actual dates assigned, concur in placing the pyramids of Egypt as the oldest of all architectural objects either in existence or of which any record or description whatever is preserved. Yet, with these evidences of extreme antiquity, we are startled, says a writer in an English exchange, to find Egyptian art as nearly perfect as in later ages, when Greek science and refinement had been brought to bear on its elaboration and refinement. Think only of the mechanical powers involved in transporting the huge blocks of granite from Syene to Memphis, of squaring them with a mathematical accuracy never surpassed, of polishing them to a surface smooth as glass and of raising them higher than such blocks were ever raised in any buildings in the world and setting them there with so wonderful a precision that after thousands of years have passed over them there they yet remain without flaw or settlement. As examples of technic art they are unrivaled among the works of men, but they rank among the lowest if judged by the æsthetic rules of architectural art. The same character belongs to the tombs and buildings around them; they are low and solid and possess neither beauty of form nor any ornamental feature worthy of attention or admiration, yet, like the pyramids, in evidences of lasting stability they have attained the object their builders had principally in view when they designed them. The moment we pass the local limits of the necropolis of Memphis we become aware of the presence of a new style of architecture, differing in almost every respect from that which preceded it and in many respects remarkably antagonistic. No longer do we see pyramids or traces of quaint wooden structures, but in place of these everywhere obelisks and temple palaces. The simple grandeur they evince is universally owned and their almost unvarying characteristics are familiar too, but of their enormous size or extent nothing but an actual survey can afford a true conception.

The temple of Karnac Mr. Fergusson designates as "perhaps the noblest effort of architectural magnificence ever produced by the hand of man," the principal dimensions being 1200 feet in length by about 360 feet in breadth, covering therefore about 430,000 square feet, or more than twice the area of St. Peter's at Rome. It must, however, be recollected that our modern buildings are all under one roof, which was not the case of old; a considerable portion at Karnac was quite uncovered. The temple at Luxor is another work of overwhelming grandeur; and besides these there stood on the western side of the Nile the Memnonium or great temple of Amenophis III, now almost entirely ruined, owing to the marshy site on which it was built. After a long period of misfortune and decay, from which she was recovered by the enlightened policy of the Ptolemies, Egypt presented in her architecture a like revival, not to an equal purity with the great national era, but still with much richness and splendor. Of edifices erected at this later period may be mentioned the temple at Edfou, usually known as Apollonopolis Magna, those at Dendera, at Kalabsche and at Philæ. There are also not a few curious rock cut temples both in Egypt proper and in Nubia; also many excavated labyrinthine tombs of mysterious solemnity. Of domestic architecture very little remains; but in paintings and sculpture so many illustrations have been handed down to us that there is no difficulty in forming a correct judgment both of its style and details. There is every reason to believe that the cities which have passed away were every way worthy of the temples that adorned them, and that the streets were as splendid and tasteful as the public buildings themselves, and displayed, though in a more ephemeral form, the same wealth and power which astonish us in the great monuments that remain.

FURNITURE FOR PORCH AND LAWN.

BY PAUL D. OTTER.

EACH year that passes witnesses greater comfort in the arrangement and equipment of the porch of the modern dwelling and about the lawn, or shall we say the grass plot, for many of us are within the high priced territory of the city or town, where the usual 25 x 125 feet marks a man's estate. On this fixed boundary there is little space in front of the porch or in the rear to furnish with portable or fixed furniture, such as one may see about a large estate. Indeed it would be pretentious and unrestful, to say nothing of the extra work a cluttered up space always requires. There are, however, a few pieces which may be made and properly placed within a small area, which in connection with a well groomed grass plot gives us pleasure in our summer walks along a residence street.

The chairless porch does not create the impression of restfulness and hospitality; here there is no implied invitation to "come up and sit down." Across the way, though, there is always "open house," or rather open porch, chairs a plenty, husk mats and rugs, ever ready to lure a passing friend to tarry in comfort. This hospitable spirit is so much embodied in the modern plan that the porch is not a mere covered bracket, but has grown to be a room with three open sides, deep enough that special made furniture will not be subject to so much damage from moisture as under the narrow porch. It is no doubt true that with the contracted porch the carrying out and back again each night of the favorite chair discourages many from courting nature and all the benefits of the "open air treatment."

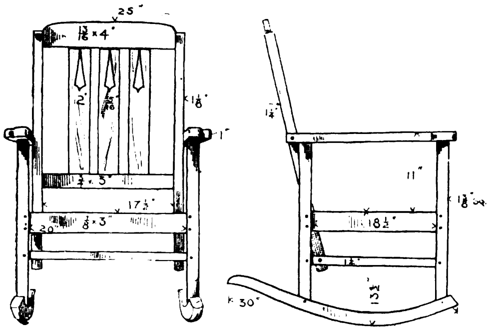


Fig. 1.—Porch Rocker, Showing Front and Side Views.

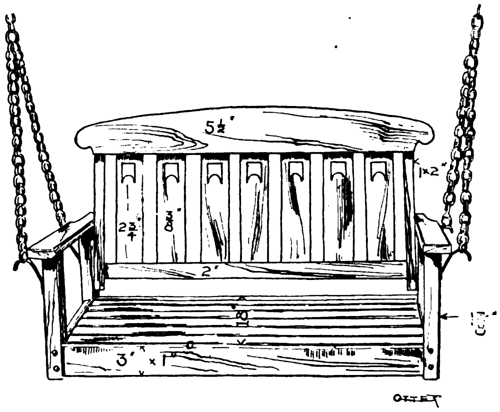


Fig. 3.—Porch Swing 4 or 6 Feet in Length.

Furniture for Porch or Lawn.

The outdoor chair or piece of furniture has no glue in its construction, as it depends on tight mortise and tenon joints, with pins, or in many cases rivet nails. There would be no harm in gluing some joints if it is intended to heavily coat the surface with paint, but even then a nail should pass through the side of the mortise into the tenon. Naturally large parts should be used in the construction of exposed furniture. The general proportions of the Mission style are more appropriate for porches than for some interiors of limited space.

In Fig. 1 of the illustrations is shown what in its essential features is an outdoor chair, and following the prevalent fancy might be made larger in its parts than indicated on the drawing, but this, however, is entirely a matter of individual preference. Plain oak is the favorite wood for this style, treated in a dark brown tone, which now is designated as "weathered." This character of chair, made in ash or chestnut and treated with a transparent green stain, looks very attractive for the porch. Avoid by all means a water stain for porch furniture, for should a chair intended to remain for the season on the porch or one accidentally left out over night become wet by a heavy dew or a night shower much damage might be done to dresses when next it is used. An oil stain is preferable; and furthermore do not use shellac for a preparatory coat for a wax rub; rather use the chair for a time with the oil stain well rubbed dry and bright. To brighten the piece from time to time go over it with a rag filled with half boiled oil and turpentine, then polish with a dry cloth.

Now as to Fig. 1, the measured illustration is easy to follow. In beginning such work it is of course the proper and reliable way to make a rough half size detail drawing, when no false cuts ensue and the various bevels may be transferred to the material from the paper without guesswork.

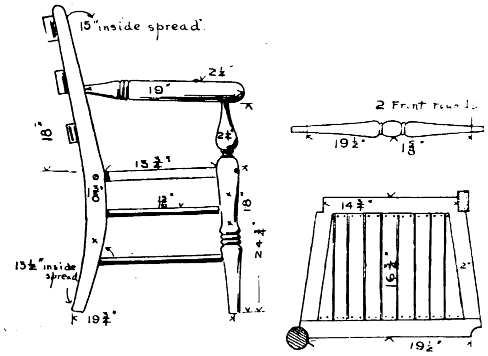


Fig. 2.—Details of Porch Arm Chair.

The comfortable inclination of the back is secured by holding the lower ends of the back posts at a properly determined position on the side stretcher by means of a carriage bolt, and at the arms also. Small head stout wire nails should be driven where mortise and tenon come together, and this should be done while the parts are held together by bar clamps. On the inside, where posts and rails join the seat frame, triangular corner blocks should be held by stout screws, and one long screw should enter the block and the corner of each post. For outdoor requirements a slatted seat will be the most reliable, unless the more comfortable double cane or a splint bottom seat can be obtained. A cleat must be nailed on inside of the side rails ⅝ inch below the edge and upon this ½ x 1½ inch slats may be nailed, slightly parted. The slats should have the edges well rounded and the top slightly crowned. Naturally a loose leather bag cushion would add to the comfort, and this could be readily taken in at night. The rockers come from a plank 1½ x 4½ x 30 inches.

There are certain chairs which are typical of our American life, public and private. They have a sturdy look that suggests primitiveness. The chair shown in

Fig. 2 is such a pattern. We would miss it if we did not see it in a country lawyer's office or in rows along a hotel veranda and the home porch. It is recommended as a good chair to make, being readily put together. It is very seldom made in oak, maple or walnut being used, although that again is a matter of individual taste. In maple the club arms by use become smooth and polished, which properly would not be the case should chestnut or ash be used. A frame with a slat seat is shown in lieu of the usual and more desirable double cane seat. The three slats, each 3 inches wide by 13-16 inch thick, are worked out of stock 2½ inches thick, conforming to an arc of a circle within 2½ x 15½ inches in length. This and the post should be laid out and paper patterns made.

The seat is secured by a square shoulder in the back, and the front corners are turned out in conformity with the heavy turned post, as shown, then secured by long, heavy screws on the sides of the back posts and diagonally through the front posts.

The porch swing appeals to many after experiencing the horrors of a hammock. However alluring these bright fish nets have been, they are not what they look to be, and are traps to double one up out of all dignity. The swing, it is true, is not altogether comfortable without pillows, but if care is used to firmly adjust the back a little greater than a chair bevel it will in itself be restful, with its slight swaying motion from chains suspended from the ceiling beams. A welded link chain of 5-16-inch iron should be used—a single chain suspended from the roof beam and running half the length to a double chain —as shown. This back adjustment to swing, shown in Fig. 3, is secured as directed for the back of the rocker in Fig. 1. Arrange the arms so that they are 10½ inches from the top of the seat to the top of the arm. This will be proper support for a pillow placed in the corner. Bolted construction is the best for such a piece of furniture held in suspension. Two bolts passing through the front pillar along the side rail and into the back pillar, with washers and nuts in the rear, will make a reliable framing. The front and back rails may be secured by shorter carriage bolts through pillars and into holes in the ends of the rails, with a sunken place to receive and draw up the bolt with a nut. Stout corner blocks should also be placed under the slat seat.

Fig. 5.—Companion Chair.

Fig. 4.—Lawn Table and Chair.

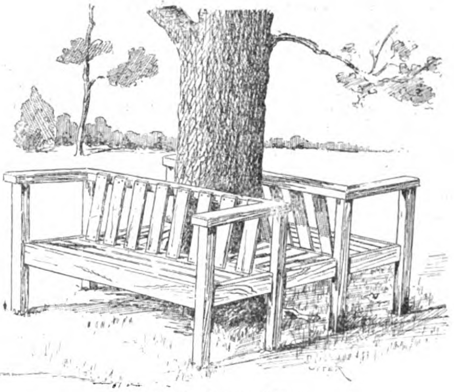


Fig. 6.—Lawn Settee.

Furniture for Porch or Lawn.

As the swing fulfills a purpose in the summer, it could also do service for a hall or den settee by providing an under rack or leg and stretcher parts, to be fitted and fastened by underscrew blocks. This is mentioned here as it might be found desirable to make a complete settee, putting in double stretchers or strainers between posts under the seat. When completed saw off the posts a half inch from the under edge of the seat rail. This lower part may then be put away until the winter months, when the two parts may be reunited by loose dowel joints and held firmly by a tie plate or block at each post under the seat.

Many people find pleasure in having a "Dutch lunch" on the lawn, and for this a few tables appropriate for outdoors should be made. While there can no glue enter into the construction of the table and chair shown in Fig. 4, the fitting of parts should not be carelessly done. The legs, dressed to 1⅜ inches square, should be fitted to the proper bevel under the top plate or batten, which will answer also in holding the top from warping too greatly. For this use plenty of screws. Two stout square sticks may be halved to support the lower shelf and this is to be held down by screws from underneath. By a proper selection of hickory branches a rustic effect may be produced, while adding greatly to the strength of the table. The slant of legs shown in the picture may be marked on the drawing at 4 inches under the ends and 3 inches under the sides, spreading them in line with the outer edge of the top at the floor line, which is 29 inches under the top. Incidentally the German chair shown would give a good setting to the lawn. The companion chair, Fig. 5, should be part evidence of one's hospitality, not to say that in it one can become in a summer thoroughly acquainted with one's wife. The dimensions of the seat frame are 17½ x 42 inches, 1¼ inches thick, provided with slightly parted slats. The posts, straight and curved, should be dressed to 1½ inches square; a sufficient curve may be secured from a plank 4½ inches wide. The hight of the back should be 22 inches from the top of the seat. In other particulars as to bevels one may be guided by almost any house chair, as the one under construction should be a chair of comfort and the back therefore may have a greater bevel than an ordinary table chair.

Sufficient size is in the posts to fit the seat into a diagonal gain, sawing off the corners of the seat to fit the groove firmly when drawn up by a long, heavy screw or

the window should have three sets of sashes and window frames. A space about 15 inches must be filled with sawdust on all sides between the brick outer walls and the inside finished walls of the store room. The inside walls are made of light joists J nailed to the floors and ceiling with clean pine boards or matched strips D nailed to them. Strips of tarred paper R may be tacked on the walls inside of the space reserved for the sawdust. The space between walls is filled with very dry, clean sawdust up to the top of the room and later on continued to the roof.

Continue the brick walls up to a hight of 18 feet, which will then form the support for the slanting or peaked roof. Inside of the brick walls build an inner partition of wood with space between for sawdust. This inner partition should be supported by heavier joists than on the first floor and at the roof they should be braced with supports against the brick work. This is to prevent any damage from the lateral pressure of the stored ice, which as it melts might slide from its position and get jammed against the walls.

The construction and finishing of the flooring of this ice room is most important. If it leaks the water will drip through the floor to the store room, for the melting ice must continually keep it wet. The floor is made preferably with zinc sheets Z. The method of doing this is to lay strips of rubber sheeting on the floor beams and then nail the zinc sheets down firmly. The rubber makes the joints water tight and even air tight. The zinc flooring must have a slope in one direction to carry off the moisture. The drainage pipe should be attached to the lowest part of the zinc floor and connected with the ground outside. The drainage pipe should be protected by several inches of sawdust to prevent it from freezing and should in no way be exposed to freezing weather. When the zinc floor is put on the slope toward the drainage pipe is obtained by bending the sheets or by having grooves made in them at first.

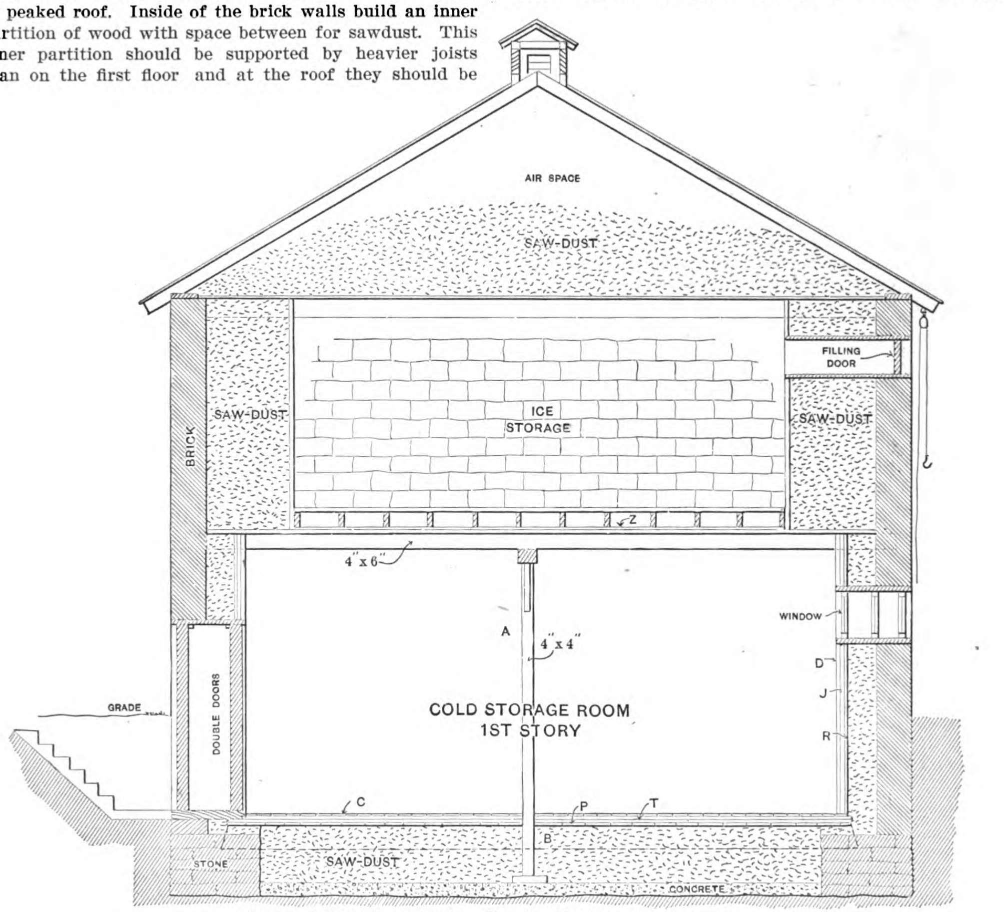


Fig. 1.—Vertical Cross Section, Showing Manner of Construction.

Cold Storage House for a Country Home.

The ice does not rest on the zinc floor. A platform is built up for it. This is made of joists laid on edge and nailed rigid with strips of pine and then floored over with rough timber. The platform should be open so that the drip from the ice is in no way interfered with. The inside wall should be built up to the edges of this platform.

The spaces between the walls are next filled with dry sawdust as on the first floor. There is only one opening in this part of the building and that is a small door for the reception of the ice. This is located well up under the roof on the north side. It is protected by double doors with an air space between which can be filled with sawdust in winter after the ice is harvested.

The ceiling of the big ice-room is composed of light joists with rough planking nailed cross-wise over them. There is no weight to be carried by this floor other than a thick layer of sawdust. This extends up to within two or three feet of the peak of the roof. The air space between the sawdust and the roof is connected with an open ventilator on the top. All the openings for the sawdust layers connect directly with this air space and any disagreeable odors or superfluous moisture can be carried away through the roof ventilator.

The ice should be cut in square blocks and packed away snugly in the space provided for it. The less space left between the blocks of ice the better they will keep in warm weather. The filling of the house is accomplished by a small block and tackle attached to a beam under the roof. A wagon load of ice from below can then be easily hauled up and packed in the icehouse by two men. The cost of filling such an icehouse depends chiefly upon the price of labor and team hire, but it should not exceed $25 where ice is abundant.

With such a combination icehouse and cold storage room constructed its value and convenience will readily suggest themselves. The cold room is located just below the ice and is surrounded on all sides by double walls packed with sawdust. It is consequently an easy matter to keep the temperature near 34 degrees in winter and 35 to 36 degrees in summer. The ice performs its work automatically, and if the drainage pipe is properly constructed the icebox will need no attention the year round Before filling with new ice each winter the whole place should be cleaned and repaired. Wherever the sawdust packing shows dampness it should be removed and dry put in its place. The leak should also be located and repaired. The roof of the ice house must be waterproof in particular, and occasional examination of the sawdust layer immediately under it will show whether it is water tight. If ordinary wooden shingles will not make the roof tight an outside covering of tar cloth should be fastened on, but a good cedar shingle roof should prove sufficient for the ordinary house.

The cold storage room below should be divided into different spaces for the storage of milk, eggs, butter, meats, fruit and vegetables. Any convenience that will suggest itself can be easily provided. In summer time fresh strawberries, cherries, berries and tomatoes plucked from the garden should be carried directly to the cold storage room, where they will retain their plumpness and delicious flavor for days. It is by chilling fruit and vegetables in a dry place that their keeping qualities are prolonged. Likewise fresh eggs retain their freshness for a considerable length of time if immediately chilled. Such a storage house should prove of such value on the ordinary country place that its cost many times over would soon be paid for.

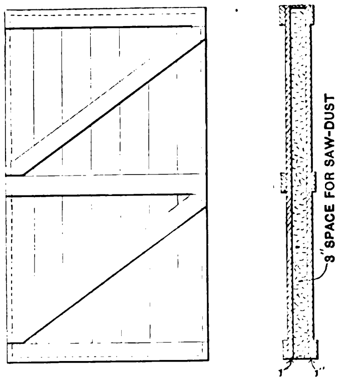


Fig. 2.—Elevation and Section of One of the Double Entrance Doors.

Cold Storage House for a Country Home.

Where the owner of a country place ships a few choice products of his farm or garden to fancy markets the need of such a cold storage house is imperative. It is almost impossible for him to handle fancy produce without such facilities for chilling the fruits and vegetables until sorted and crated for shipment.

The keeping of winter apples, pears and grapes is largely a matter of adequate storage facilites suitable for such use, and if one part of the room is devoted to fancy winter fruit no great loss from decay and depreciation will be experienced. The ordinary cellar under barn or house is a poor storage place compared with such an ice house and cold-storage room, for the former has neither the equitable temperature of the latter nor the pure, dry atmosphere which is essential to preserve sweetness and flavor in most country produce.

The ventilation of the icehouse should be watched and occasionally it may require a little regulation. Much depends upon the weather and the evaporation of the ice. If the upper air space shows considerable dampness the ventilating outlet may be increased in size, but if the air is dry and sweet no change is needed. The sawdust needs to be kept dry and its condition should be ascertained occasionally by burrowing the hand well down into it.

Likewise it is very important that the drainage around the house and storage room should be perfect. The site for the house should be selected with a view to natural drainage, but if this cannot be obtained earthen drain pipes should be placed in the soil below the level of the foundation. This will conduct the water away and prevent any dampness. The drainage pipe carrying the drip of the ice away should be buried in the soil away from the house. Where this ends the soil should be scooped up for some distance away and the hole thus dug filled with loose sand. This will spread the moisture around, so that the surrounding soil can absorb it without causing any trouble.

An icehouse of this character can be built from $500 up, according to the price of labor and materials, and also according to the method of finishing off the interior. A practical man who can give his time and mind to the problem can greatly decrease the cost and by securing second-hand lumber for a good deal of the rough work the cost is brought down to very reasonable figures. When finished the building is good for a century of usefulness with only such annual repairs which every house requires, but with brick walls and stone foundations the repair items are really very slight and inexpensive.

◆

Brick from the San Francisco Ruins.

An important feature in the rebuilding of San Francisco will be the disposition to be made of the many million of fallen bricks from the ruins. Many of the best will be used after cleaning, a number of machines designed for that purpose being in use. The structural engineers' organization has taken up the subject of investigating the feasibility of utilizing brick bats in making concrete for building purposes. Several instances of their successful use in the vicinity of San Francisco are on record. The effects of the earthquake have demonstrated that concrete containing broken brick has stood as well as almost any other concrete.

The large four-story factory of the Pacific Coast Borax Company, on the marshes at Alameda, Cal., was constructed of concrete which contained a large quantity of broken brick taken from one of the pioneer buildings of San Francisco. The foundations of Gladding, McBean & Co.'s large terra cotta and pottery works, near San Francisco Bay, were made of concrete containing refuse from the terra cotta and brick plants. Both of these structures were uninjured by the great earthquake of April 18.

◆

Buildings in Philadelphia.

Statistics recently compiled tend to show that Philadelphia is the best housed of the big cities of the country, there being an average of only five persons to a dwelling. According to the official returns just computed, there are 290,701 dwelling houses within the confines of the 43 wards of Philadelphia, 5482 industrial plants of all kinds, 818 churches, 308 public schools, 88 bank buildings, 647 buildings used for office purposes, 305 structures occupied by benevolent and charitable organizations which are free from taxation, and 135 buildings for the manufacture of malt and spirituous liquors. The compilation, which is based on the figures up to January 1 of the current year, shows an increase of 10,006 structures for the year, of which 8584 were dwellings.

◆

A BILL giving to the police authorities the power to license pickets during strikes has passed the House of Representatives of the Massachusetts Legislature. It provides that in case of a strike or lockout the chief of police, or in a town whoever holds similar power, shall ascertain the number out. It shall be lawful for these persons to elect by ballot representatives who shall be permitted to walk upon the public streets and ways in the vicinity of the place of employment, and in a peaceful manner converse with persons intending to go to such employer for work, in order to induce them not to work. The number of such pickets, legal representatives of the men who are out, shall not exceed one for every 20 or larger fraction of 20. Only one set of representatives shall be elected during one strike or lockout, but vacancies by death or disability can be filled. These representatives shall have credentials which the chief of police shall record and countersign.

THE EARTHQUAKE AND THE LUMBER TRADE.

By H. A. Crafts.

No trade in the long line of industries vitally affected by the great earthquake in California and subsequent conflagration in San Francisco was more so than the lumber trade. When the vast amount of lumber already in use and devoured by the flames, the destruction of stock material burned in the San Francisco lumber yards and the demolition and damage of buildings throughout the earthquake zone are taken into account the sum total of loss is almost incomputable.

The business part of San Francisco and more than half of the residence portion were completely wiped out. Not only a large proportion of the business houses were of wood, but the residences were almost exclusively of that material. The fire also got into the great lumber yards of the city, and it is estimated that at least 40 per cent. of the 90,000,000 feet on hand, or in the aggregate 36,000,000 feet, were consumed.

Then take the earthquake wreckage for a strip of country fully 200 miles along the Coast from Point Arena, Mendocino County, to Salinas, Monterey County, and at least 30 miles wide, including such badly damaged towns as Santa Rosa on the north and San José on the south, and the destruction of wood material mounts still higher and gives some idea of the future draft upon the lumber supply of the Pacific Coast that will be necessary to repair the damages and place the stricken country back again upon its normal footing.

I was in San José at the time of the shock, remained over one day and returned for another day at the end of two weeks and know something of the wreck and ruin wrought in that town and vicinity by the tremor. On the day of the earthquake I journeyed from San José to San Francisco, a distance of 50 miles up the Southern peninsula of the Bay of San Francisco, and back again to San José, so that from the car window I had a fair view of the wreckage caused in the long line of towns and villages between those two points; but it would require chapters to describe in detail the havoc wrought. There are at least a dozen fair-sized towns and cities along this line of travel, including Santa Clara, with a population of 4,000; Palo Alto, with a population of 3,000; Redwood City, with a population of 2,000, and San Mateo, with 2,500 population.

Damage to Neighboring Towns.

In all of these towns, including San José, business houses and public buildings were badly wrecked, while in San José I saw both one and two story frame dwellings in ruins; while such large frame buildings as the California Pine Box Company's factory and the annex of the Vendome Hotel were mere heaps of kindling wood. When it is taken into account that the shock as affecting Santa Rosa and the other towns of the northern peninsula was more severe than on the southern peninsula a still clearer idea may be obtained of the havoc wrought throughout the stricken territory.

Of course a part of the wrecked material may be utilized second-hand in rebuilding and repairing, but the amount will cut but a small figure in the sum total of the vast amount of material that will be required in the general work of rehabilitation.

San Francisco, as well as nearly every town within the affected district, was in the midst of a very active building era. Thousands of structures of all kinds were in process of building, while the architects and builders were busy preparing plans for prospective structures. Now when it is taken into consideration not only that all of the damaged and destroyed buildings will be replaced, and many replaced in enlarged and improved form, but that all the buildings that were in process of construction and in contemplation will in all probability be erected, the lumber proposition again looms largely upon the horizon.

Not only the logging camps and saw mills of the Coast will be taxed to their utmost capacity, but the transportation facilities will be strained to their utmost in forwarding the vast amounts of material required from place of manufacture to the great lumber marts of the earthquake belt. The great bulk of the lumber that will be used in this work of reconstruction will be composed of the California redwood, so that there will be very busy times indeed among the lumber camps of Humboldt and Mendocino Counties for a period of years to come. The balance of the lumber required, excepting, of course, the hardwood, will be composed of pine and spruce and will come principally from the lumber camps of Oregon and Washington.

Although San Francisco has been dealt an awful blow by the combined forces of earthquake and fire her citizens appeared to be imbued with dauntless courage and an indomitable will, and as almost unlimited financial backing appears to be at hand it is probable that the city will be rapidly built, and that, too, in an enlarged and improved manner. As soon as the *débris* is cleared away the great work of reconstruction will begin. In less than a year from the date of the earthquake shock the work will doubtless be in full swing.

There were a great many steel, stone and brick structures going up in San Francisco at the time of the shock, as well as a large number of residences. A good many flats were being built. It is the general opinion that, while in the fire limits, which by the way have been largely increased since the fire, the buildings will be of a fireproof nature, the new residences will to a very high percentage be built of frame, and this will mean the very extensive use of redwood lumber. From a residential point of view it is the general opinion that San Francisco will always be a wood town. Of course the precautions against fire and provisions for fighting fire will be doubled, so that the chances of another extensive conflagration will be minimized to a very large degree.

Demand Larger Than Supply.

At present the demand for lumber in San Francisco, Oakland and the neighboring bay cities is much larger than the supply, and every possible expedient is being resorted to to increase the latter. The lumber producers of the Coast are discriminating in favor of San Francisco in their shipments as much as possible with due regard to commercial amenities. Many of the San Francisco dealers had orders in for other points, and much lumber had been loaded under them. These are being recalled where consistent and the shipments diverted toward the burned city.

The carrying facilities are also being increased. The railroads cut but a small figure in the transportation of Coast lumber, the very large percentage of it being carried by water. Consequently many additional vessels are being put in commission and the lumber carrying fleet promises to soon reach very large proportions.

A great many of the old business sites in San Francisco are being covered with temporary one-story frame buildings and this line of construction creates the bulk of the present demand for lumber. Then across the bay in Oakland there are many frame wholesale houses, manufacturing and trading plants going up, to say nothing of the great number of temporary, as well as permanent, dwellings being erected in San Francisco. Dealers tell me that even this trade has doubled the demand for lumber, both in San Francisco and Oakland. Yet the two cities were not without a supply to start with. In San Francisco there were the 54,000,000 feet saved from the flames, while the seven yards in Oakland had 40,000,000 feet more that could be drawn upon; and the dealers are hopeful that every demand will soon be met.

All of the big lumber companies are replenishing their stock as fast as possible, and the supply is being dealt out with careful discrimination. Despite the largely increased demand for lumber prices have been advanced but slightly, say from one to two dollars per thousand; and this advance was not made by the dealers but by the loggers.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

JULY, 1906.

Some Lessons of the San Francisco Disaster.

Since the appalling disaster to the city of San Francisco the ruins have been visited by architects, engineers and building experts from all over the country with a view to studying the situation and noting the conclusions to be drawn from the effects of fire and earthquake upon various forms of construction. Naturally the keenest interest has centered around the steel skeleton frame structures, as it was this type which seemed best to have withstood the trying ordeal. According to the building expert whose comments appear at length in this issue of the paper, and who spent several weeks directly after the disaster in carefully examining what remained of the more important buildings, not one of the steel framed structures was damaged by the earthquake, although the buildings must have been badly racked by the shocks as indicated by the cracks in the piers between windows and in the condition of the brick, stone and terra cotta fronts. One of the vital points about a building is the thoroughness with which it is fireproofed and the methods employed for protecting the steel frame work from the action of intense heat. Naturally close attention was given by the expert in question to this phase of construction, and he found that for the most part steel work fireproofed with concrete stood the test very well, while terra cotta was torn off and destroyed in almost every instance. Where terra cotta was used for fireproofing around columns it came off, and a large proportion of the floor arches either fell out or the bottom plates of the arches broke off, leaving the latter in very bad shape. Probably the most successful method of fireproofing columns and which stood the test the best was that used in the Merchants' Exchange Building, where the columns were encased with two thicknesses of wire lath and plaster with an air space between. The air space undoubtedly contributed to the good results shown, but it is probable that the outside thickness broke the force of the heat and the inner covering was capable of withstanding the degree of heat which reached it. In the opinion of the expert in question there would seem to be no necessity of changing the methods of constructing the foundations and the steel frames, but greater care should be exercised in building the walls and in anchoring them to the frame work. He points out that there is no question that reinforced concrete walls would prove to be the best construction, not only to resist fire, but earthquake shocks, as the reinforced walls could be fastened to the steel frame of the building. Another suggestion by an architect who has studied the situation is that the steel cage construction should have gusset connections, the floors should be of reinforced concrete, and there should be a curtain wall of reinforced concrete with a net work of reinforcement intertwining the columns and spandrel beams, while the brick facing should be bonded into the concrete with a course of headers in every sixth course. All sash and doors, as well as their frames, should be of metal filled with cement, and all trim should be of metal. The elevators and stairways should be separate and should be inclosed with fireproofed partitions or wired glass. These naturally were subjected to the strongest drafts and the most intense heat. In a number of cases the metal parts gave way, allowing a portion to fall, thus doing more or less damage to fireproofing on important columns and exposing the latter to the action of the heat. In a number of cases buckled columns are thought to have resulted from this cause, and the sagging of the floors which followed this naturally exposed other portions of the steel frame.

Fire Resisting Roof Coverings.

In view of the disastrous experiences through which different cities have lately passed and the relation thereto of the vulnerability of the roof coverings of buildings there will doubtless be added a still more searching inquiry into kinds of roofing with the lessons afforded by the San Francisco calamity. The effect of the severe conflagrations that have followed one after the other in recent years is showing itself in the growing use of tin clad and otherwise fireproofed doors and doorways to shafts and stairways in buildings and in exposed building walls, and in the extensive use of wired glass for protecting the glazed portions of buildings likely to be especially exposed in times of fire. It does not seem that the roof itself has been given quite as much attention as the condition of things warrants. One of the particularly important buildings of San Francisco which had weathered the earthquake and was resisting the blast of flames later blown against its sides was only saved after herculean and heroic efforts on the part of its defenders, whose work was directed to preventing the roof from igniting. The building was one of the early ones erected by the Government and did not have a roof of suitable fire resisting qualities. Insurance underwriters who have made a study of the behavior of different roof coverings in a conflagration express a strong favor for metal roofing of all kinds in preference to tile, slate or other material, the relative fire protection values being respectively as mentioned. In some cities the laws prescribe that the cornices of buildings must be of metal, brick, tile, stone or some other noninflammable material. This is due to the fact that flames issue from the windows of burning buildings and play up against the cornices. If it is advisable to provide building laws with such requirements as a means of fire protection there is every reason that the regulations should be extended so as to proscribe the use of any roof covering material except those which would be a safeguard against fire, or at least noncombustible when the flames of an adjoining building should play against them. All of our readers are familiar with the fact that the firebrands which rise from a burning building and are carried across a city, when falling on metal roofs, slate roofs or tile roofs do no damage, while buildings covered with a combustible material often require great efforts to prevent the roofs from catching fire and ultimately destroying the entire building. In recent years, in addition to the use of tin plate for roof covering those who desired permanent buildings have gone to the expense of sheet copper, both for its lasting qualities and its value as a protection against fire. Those who are now engaged in a movement for the betterment of tin roofing and the materials of which it is composed are working in the interest of the public welfare. It is to be hoped that their efforts will be attended with a larger measure of success than the most optimistic desire. It is only necessary to look out of the windows of any tall building to see that many

roof coverings are not well calculated to protect against fire, particularly when brands from buildings already burning are in the air and falling. It is important that the building codes of all large cities should make rigid restrictions in reference to roof covering material. Where the roof of a low building is sending up dense volumes of smoke it may enter the windows of adjoining higher buildings and, if such are hotels or apartment houses, the occupants are in danger of suffocation even when the building suffers no damage from the fire.

State Aid to Industrial Schools

The recent report of the Massachusetts special commission on industrial and technical education will strike home to all employers of skilled labor, and the methods suggested for relieving existing laxness in the system of training young people for productive pursuits will probably meet with a good deal of commendation. State aid for industrial schools is the remedy outlined in a bill presented to the last Legislature as a part of the report, the aid to consist not only of contributions of money, but in the stimulative efforts of an expert commission. The results of the careful investigations of Carroll D. Wright and his associates of the commission agree perfectly with the results of the test of full industrial activity of the country as exemplified by the experience of manufacturers in their efforts to secure skilled workmen. The report points out that compared to opportunities afforded in Europe for acquiring knowledge and skill in productive industry the work now being done in Massachusetts is strikingly inadequate, and it is a well-known fact that conditions are no better in the other American States. Says the commission:

> The productive industries of the State, including agriculture, manufacturing and building, depend mainly upon chance for recruiting their service. A few apprentices still exist in a few industries or parts of industries, and very few apprentices are indentured and many so-called apprenticeships are falsely named. The knowledge and skill which the new men bring to the service of any industry are only what they have picked up in a haphazard way. Some bring much and many bring little. This condition tends to increase the cost of production, to limit the output in quantity and to lower the grade in quality. Industries so recruited cannot long compete with similar industries recruited from men who have been technically trained. In the long run that industry, wherever in the world it is located, which combines with general intelligence the broadest technical skill, will command the markets of the world. The industries of Massachusetts need, in addition to the general intelligence furnished by the public school system and the skill gained in the narrow fields of subdivided labor, a broader training in the principles of the trades and a finer culture in taste as applied to material, workmanship and design. Whatever may be the cost of the training, the failure to furnish it would in the end be more costly. The State needs a wider diffusion of industrial intelligence as a foundation for the highest technical success, and this can only be acquired in connection with the general system of education, into which it should enter as an integral part from the beginning.

Of course these sweeping statements as applied to present-day business methods will permit of contention when present-day results are also taken into account. But passing by consideration of anything but the future needs of the country as regards skilled labor, it is well recognized that the apprentice system, the results of which still figure importantly in our industries, seems to revive but little under the lessons now being taught and that some substitute must be provided to care for the industries as they will exist a few years hence. The remedies suggested by the commission and in part embodied in its bill submitted to the Legislature lie along two lines of industrial education—one the existing school system from its elementary grades through the high schools, the other independent industrial schools. It is recommended that the curriculum of the elementary schools be changed so as to include instruction and practice in the elements of productive industry, and that the work of the high schools be so modified that instruction in mathematics, the sciences and drawing shall show application and use of these subjects in industrial life, with special reference to local industries. It may be doubted if the modern educator will co-operate willingly in bringing about an early realization of these suggestions. But the recommendation embodied in the following extract from the bill seems essentially practical, as has been demonstrated in various industrial schools already existing:

> All towns and cities (or two or more cities and towns uniting as a district) may provide independent industrial schools for instruction in the principles of agriculture and the domestic and mechanic arts, but attendance upon such schools of children under 14 years of age shall not take the place of the attendance upon public schools as required by law. In addition to these industrial schools towns and cities may provide for evening courses for persons already employed in trades, and they may also provide, in the industrial schools and evening schools herein authorized, for the instruction in part time classes of children between the ages of 14 and 18 years who may be employed during the remainder of the day, to the end that instruction in the principles and practice of the arts may go on together.

Under the bill the State would bear a portion of the expense of industrial education, for it provides that where money is appropriated for the establishment and maintenance of independent schools for industrial training, or where new day or evening industrial courses in high or manual training schools are instituted, the State shall share the expense by a sum of money proportionate to the amount raised by local taxation and expended for the support of schools; towns and cities expending more than $5 for $1000 of valuation for the support of public schools to be reimbursed by the State to the amount of one-half; those expending between $4 and $5 per $1,000 to the amount of one-third, and those expending less than $4 to the amount of one-fifth of the cost of maintaining industrial courses or industrial schools. This would be liberal State aid, and doubtless it would be but fair that the State should share the expense of a class of schools which would produce skilled labor to be later widely distributed.

San Francisco's New Building Laws.

The committee having in charge the laws which will govern the erection of new buildings in the devastated city of San Francisco has decided that the hight of skyscrapers, class A, steel-brick buildings, will be limited to two and one-half times the width of the street on which they may be located. This will permit the erection of buildings more than 200 feet high on Market street and limit them to 155 feet on Montgomery street. The hights of other than class A buildings have been fixed as follows:

Class B, fireproof buildings, 102 feet; class C buildings, with metal lath, 70 feet, and with wooden lath, 55 feet; frame buildings, 45 feet.

Class A and class B buildings are to be built of incombustible materials, and allowed in any part of the city. Class A buildings are to have steel frames carrying all wall and floor loads.

Class B buildings are to be built either with steel or reinforced concrete walls supporting a part of the floor loads, or with walls self supporting only, the floor being carried on the steel frame; all floors to be fireproof, and except the frame to be equal in all respects to class A.

Class C buildings are to be built with brick or concrete walls and timber interior; to be in effect the same as class B. Class C buildings of this sort will be allowed in all parts of the city.

◆

THE new theater building to be constructed in Central Park West, at Sixty-second and Sixty-third streets and Broadway, in accordance with plans prepared by Carrere & Hastings, 28 East Forty-first street, will be of stone and will cost nearly $2,000,000.

CORRESPONDENCE.

Bracing a Plank Frame Barn.

From John L. Shawver, *Bellefontaine, Ohio.*—In reply to the question of "V. B.," Smithville, Ont., which appeared on page 135 of the April issue of *Carpentry and Building*, I send herewith sketches showing our method of supporting the ends of a barn from the pressure of hay and grain within. The posts are made of two 2 x 8 inch plank, with a 2 x 6 inch filler and a 4 x 6 or 4 x 8 inch stiffener, according to the size of the barn. These stiffeners are securely spiked to the inner 2 x 8 before that is placed in the frame, use being made of 60d spikes driven at a good angle about 16 inches apart. The posts thus constructed are woven into the framework, as shown in the sketches, and braces inserted from the center of the beam to the plates on either side. The beam will withstand more pressure than one braced the old way, for in that case hay and grain which are placed in the barn settle down on the braces, which take up valuable space, and this forms a leverage which is more power than the lateral pressure. Fig. 1 shows the new method of bracing the end beams, while in Fig. 2 the old method is shown. In very large barns we have used the method shown in Fig. 3, which consists of two 2 x 8s and 2 x 6s bound together by short ties, as indicated, but it is seldom that this extra precaution is found necessary.

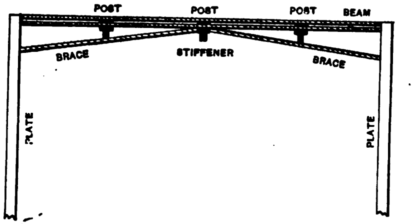


Fig. 1.—New Method of Bracing the End Beams.

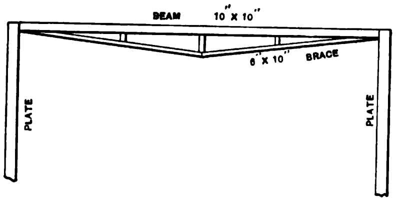


Fig. 2.—Old Method of Bracing End Beams.

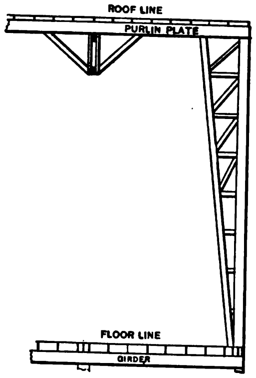


Fig. 3.—Purlin Post for High Barns.

Bracing a Plank Frame Barn.—Contributed by John L. Shawver.

Laying Out Stairs.

From Anxious Reader, *Richmond Hill, N. Y.*—I am a reader of *Carpentry and Building* and would like to know through the Correspondence Department as to the best and most practical method for finding the pitch of any staircase; also how to mark the setting out rod.

Average Day's Work for a Carpenter.

From E. B. C., *Milwaukee, Wis.*—Apropos of the discussion which has appeared in back numbers of the paper regarding the amount of work the average carpenter ought to be able to do in a day, I take the liberty of sending a few figures showing what should be accomplished in connection with various kinds of work. I will commence with the cornice, the table showing the number of feet of frieze, soffit and fascia of different widths, expressed in inches, which two men can put on in a day of eight hours:

Frieze.	Soffit.	Fascia.	No. feet.
9 inch.	10 inch.	4 inch.	80
10 inch.	12 inch.	4 inch.	75
12 inch.	16 inch.	4 inch.	60
14 inch.	20 inch.	5 inch.	48

HIP ROOFS.

Frieze.	Soffit.	Fascia.	No. feet.
18 inch.	16 inch.	4 inch.	75
22 inch.	20 inch.	4½ inch.	64
28 inch.	24 inch.	5 inch.	52
32 inch.	28 inch.	5½ inch.	40
34 inch.	32 inch.	6 inch.	32

CORNICE MOLDINGS.

	Inch.	Feet.
Crown molding, flat,	2	.800
" " spring,	4	.500
" " "	5	.440
" " "	6	.370
" " "	7	.300
" " "	8	.250
Bed moldings, flat,	1½	.775
" " "	2	.750
" " "	3	.675
" " "	4	.500

All plain base, 6 to 10 inches wide, one man will put on 150 feet in a day; all wainscoting, 2½ to 3 feet high, including dressing with ordinary capping, one man will put on 100 square feet in a day.

Regarding floors, I would state that two men will put on 800 square feet of soft wood 6-inch flooring without bridging; 600 square feet of 4-inch, and 400 square feet of 3½-inch. For hard wood floors, take two-thirds of the amount given for soft wood floors.

Appliances for Rapid Shingling.

From G. L. McM., *Tacoma, Wash.*—In regard to the shingling controversy, allow me to say that I used *Western Builder's* three-cornered perch 34 years ago in Massachusetts, where we had staging on which to work, and where they did fully as good work as in any place one could find. I have been clear across these United States both ways, and I never heard any one object to its use on account of its damaging the roof. Where men shingle to line or use the hatchet gauge it is a perfect help, both as to the amount of work done and the ease of performance, but where shingling is done by a straightedge it is more in the way than a benefit. Our shingles here run from 2 to 14 inches, the larger part being over 5 inches, and the man who cannot lay 3000 (that is an ordinary carpenter, not an expert) need not say anything about his shingling ability—on a straight roof, of course.

I heartily indorse "Toiler's" advice to beginners. As to the amount of work, however, in this section, where pine doors are an unknown quantity and most of the doors used are fir, being, therefore, both harder and heavier, not so much work can be done. One door per hour, well fitted and hinged, is a good average. We also fit all our locks before the painter gets to work, but leave them off until he is all through.

Weather Boarding a Circular Tower.

From E. F. C., *Bremen, Ind.*—In the February number of *Carpentry and Building* I submitted a method for describing a curve for siding a circular tower, which is cone shaped, and my intention was to make my explanation as clear and concise as I possibly could without the use of a diagram, and I wish to say that it is not my desire to misinform any one on any subject which I may be able to explain. I certainly feel sorry for "O. M.

T.," Ocean City, N. J., that he should think that his files should contain such bad information. It is very clear to me that "O. M. T." does not fully understand my explanation or else he would point out where I was wrong, so that other readers could see it as well as myself.

Now he says that my explanation or method (I do not know which) was radically wrong. In order to not mislead the other readers of this paper either by the "bad" information which I should have previously given or by "O. M. T.'s" criticism claiming the information to have been wrong, I would like very much to have an explanation from him stating where and what there is wrong about it.

I know quite well that we can prove to him and convince him that this bad information that is contained in his files will turn out to be good and useful information in the future to the younger generation, as well as to himself.

Backing Hip Rafters.

From L. K., *Cragsmoor, N. Y.*—In the April issue of the paper "C. C. H.," Brockville, Pa., asks for a table for finding the backing for hips. If he will apply the angle of a steel square on the toe of the foot cut of the hip rafter, as shown in Fig. 1 of the sketches which I send, being careful to keep the square even on each side, it will give the points from which to scribe, and he will find it to be better than any table. If the correspondent will take a small piece of wood and cut off one end diagonally so as to represent the foot cut of a hip rafter and place it in the position shown in Fig. 2, using the steel square to represent the plates of a building, he will see the reason for this. Also if he will cut a thin piece of wood so that it will have an octagon corner it will answer the same purpose for octagon hips that the square does for square hips. The length or pitch of a rafter will make no difference whatever. Of course if the rafter is cut with a projection the square is applied to the part of the rafter which rests on the plate, as shown in Fig. 3, and then transfer the distance *a-b* down each side from the back of the hip. I think many of the readers would be greatly aided by studying Volume I of Hodgson's "Practical Uses of the Steel Square," price $1, copies of which can doubtless be secured through the publishers of *Carpentry and Building.*

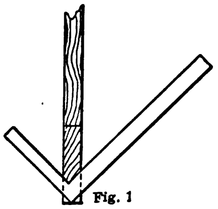


Fig. 1

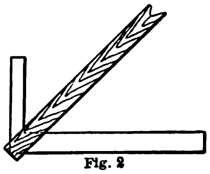


Fig. 2

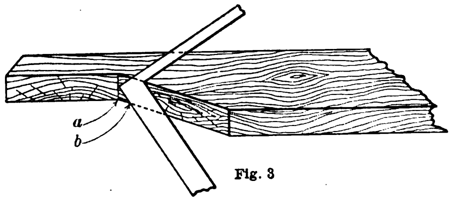


Fig. 3

Figs. 1, 2 and 3.—Method Suggested by "L. K."

From Hee H. See, *Brockville, Ont.*—I notice in the April issue of the paper that "C. C. H." asks among other things for "a quick way for any one to gauge a hip rafter for the backing on top." I think the "kindergarten" method, which I show in the accompanying sketch, Fig. 4, will be a lot easier to remember than the tables for which he asks. In laying out the work we first make the foot cut on the hip rafter; then from the center of the bottom end, as at A,, draw a line, either with a bevel or the steel square, at an angle of 45 degrees over to each side of the rafter, as at B B; continue this line along the side of rafter parallel with the edge, as from B to C. Bevel the rafter through the center of the top to this line. This simple little rule will do much more than asked for by "C. C. H." It will give the proper backing for rafters of any thickness and any pitch of roof. All that is necessary is to first make the foot cut. Of course this need only be done on the first rafter, after which the correspondent can measure the distance from the edge to the backing line and mark the other rafters with a gauge.

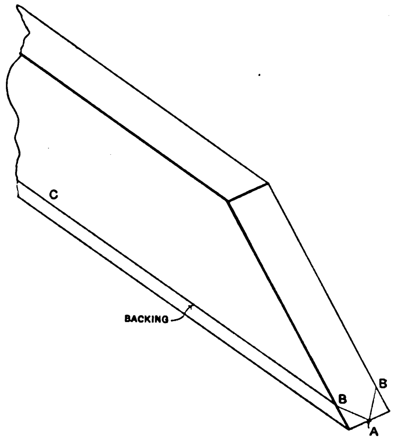


Fig. 4.—Plan Followed by "Hee H. See."

Backing Hip Rafters.—Methods Suggested by Different Correspondents.

A Reader's Opinion of "Carpentry and Building."

From D. C. C., *Jacksonville, Ill.*—I think *Carpentry and Building* is one of the best magazines for a mechanic in the building line that there is going, but I would be glad to see the articles brought down to a plane where those of us not versed in geometry and algebra might get a better knowledge of things. Frank Odell makes things plain. What I mean is this: It is much easier for me to find the area of a triangle if I am told to multiply the base by one-half the perpendicular hight than it is, for example, to understand the formula:

$$A = \frac{1}{2} bh.$$

To one who has not been used to formulæ they are confusing; at least I find them so, and even after the formula is set out the figures have to be substituted and it takes up nearly as much space.

I was much pleased with Mr. Lindl's detailed estimate of cost in connection with the $6500 first prize design house, and also with Frank Odell's articles on "Laying and Finishing Hard Wood Floors," as both the detailed estimate and the articles on floors gave us knowledge of what labor is worth in those respective localities.

Portable Scaffold Bracket.

From S. H. Palmer, *Washington, D. C.*—In the issue of *Carpentry and Building* for March of the current year, page 97, there is shown a portable scaffold which is the first illustration and description of this useful device which I have seen, although having used it for years. It is a good scaffold, and for medium hights is perfectly safe and cheap. A careful examination of the illustration, however, will show that the artist has drawn the brackets wrong side up, and if those not accustomed to this contrivance should attempt to make and use one according to the manner indicated it would subject them to great danger. The length of the wall post must be one-quarter longer than the supports for the scaffold, otherwise they are likely to tip down so that the top is a little way from the wall, in which case the whole scaffold is likely to come down. With proper proportions, how-

ever, and strong 2 x 4 for the poles, it is safe and very convenient, as well as being easily raised or lowered. Care, however, should be exercised in keeping the bottom of the poles far enough away from the wall.

Recipe for Liquid Glue.

From A. D. C., *Johnsonville, N. Y.*—Will some brother carpenter give me through the correspondence columns of *Carpentry and Building* a recipe for making liquid glue to be kept in bottles or cans for future use? I would prefer a recipe for a glue that has been tested.

Note.—There are a number of recipes for liquid glue, and with no desire to anticipate the suggestions which we hope our practical readers will offer to the correspondent above, it may be interesting to quote a recipe for an improved liquid glue which, according to the *Journal of Applied Chemistry*, may be prepared by dissolving 3 parts of glue, broken into small pieces, in 12 to 15 parts of saccharate of lime. On warming, the glue dissolves rapidly and remains liquid when cold without losing its strength. Any desired consistency may be secured by varying the amount of saccharate of lime.

Short Cuts in Framing.

From J. W. M'L., *Niagara Falls, N. Y.*—I have been a reader of *Carpentry and Building* for nearly two years, and during that time have not read a single article from any of our brother chips here at home. I am quite young in the trade as yet, but if the editor can find a little space in the paper I will try and explain to "C. C. H.," Brockville, Pa., whose communication appears in the April issue, what I consider the easiest method of finding the cuts for hip rafters. It has been shown a goodly number of times how to find the plumb and level cuts, so I will confine my explanation to the particular matter about which he asks—that is, how to work out the side cuts for hip and valley rafters to fit against a ridge board.

To find the cut against the ridge, my method is to first make a square miter mark on the bottom cut—that is, at the foot of the rafter—and square up from that mark on both sides. Place the square upon the top side of the rafter and line across from those two squared lines. This will be the cut against the ridge. In order to obtain the bevel for backing the hips make a square miter on the bottom of the rafter from the center at the long point, and where these miter marks come on the side of the rafter is the depth of the gauge. I have always found this method short and simple. I hope that some of my brother craftsmen will express their views on this subject.

Knots for Tying Sash Cord.

From J. M. B., *Monroeton, Pa.*—I notice in the correspondence columns of the paper that several of my Brother Chips have described and illustrated knots for fastening sash cord to the weights. Now, my trouble has been with the end that is fastened to the sash, and what I would like to find is a knot that can be tied close to the end of the cord so that it will not slip or pull out—one that will not stick out in the way or hinder the sash from running easily. If any of the readers can solve this problem for me I shall be very glad to have them do so, as I doubt not others are interested as well as myself.

While I have my pen in hand I am constrained to say that the man who made the front and attic stairs in a $3500 house for $24 must have been a brother of the man who laid 14,000 shingles in less than eight hours. I think "Western Builder" is taking advantage of his man in not paying him wages more in accord with the amount of work done. I have worked in different parts of the country and have never met one of those fast shinglers on a roof. However, some good may come from the discussion that is going on, as here and there a writer offers suggestions while describing his method of doing things that are not without interest to many of us.

Floor Plans Wanted for Small Cottage.

From H. V., *Chicago, Ill.*—Will some of the readers of the paper kindly furnish for publication in the Correspondence Department floor plans for a small cottage about 20 feet wide and 30 feet deep. I want bath and water closet on the second floor and the roof should be one-half from 14 foot studding.

Handrail for Well Hole at Top of Straight Flight of Stairs.

From SUBSCRIBER.—I would like to ask some of the experienced stair builders how to obtain the twist to the rail at the top of a straight flight where it turns around a narrow well hole. I would like to have the problem solved with as few lines as possible, and wish to learn if the bevel can be obtained direct from the pitch board.

Design Wanted for Stable and Carpenter Shop.

From W. W. K., *New Canaan, Conn.*—I take the liberty of asking some of the practical readers of the paper for a sketch or plan showing how to build a barn and carpenter shop having the requirements enumerated: The barn is to have one box stall and to accommodate two carriages and two wagons. I desire also a harness room and carriage wash, a loft for 2 tons of hay, a feedroom and a good sized place for the carpenter shop, the latter to have a work bench and power to run a grindstone, band saw, circular saw and also to pump water in the house. I want the barn of such size that I can drive in and also harness up inside. I hope the readers answering the inquiry will also give the cost of such a building as I have indicated.

Painting Concrete Walls.

From A. E. C., *Vancouver, B. C.*—I would like to have some of the practical readers of the paper give me their views in regard to the action of paints on finished cement walls. I am told that paints using linseed oil will crumble the cement and cause it to scale off, but that enamel paints will work on cement walls with good effect. Will some of the readers give me a solution or paint that will whiten cement work to take the place of tile? Will muriatic acid and alum in a solution or used as a wash lighten up cement work?

Will oil paints stand under water without scaling off? If not, is there a paint prepared that will stand under water—that is, fresh water?

Framing a Gambrel Roof Barn.

From W. S. H., *Watkins, Ohio.*—I have a gambrel roof barn to frame and I would like to have the practical readers of the paper tell me whether it is proper to have the short rafters at the top of the roof or at the bottom—that is, resting on the wall plate. The barn is 54 x 64 feet in size, with 24-foot posts. The beams are doubled, with caps under the lower ones on the inside bents. The purlins can be placed anywhere to suit the roof, which is of $^1/_4$ pitch. I would also like to have the readers give the best plan for bracing a roof of this kind. I think the subject of roof framing is very interesting and I would suggest to my brother chips that they freely express their views on it.

Finding Capacity of Tapering Tanks.

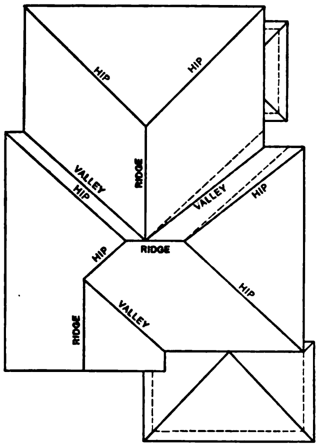
From C. E. B., *Judson, Ind.*—By way of explanation for what follows I would say to my Brother Chips that I have called around to settle the fuss about this tapering tank business. The correspondent "T. M.," from California, missed that tank of his by 133 gallons and a small fraction over. His solution is as complicated as some of those geometrical ones drawn up by authors who do not aim for you to recollect it as long as you are reading it and have some of them right at hand. Tapering tanks are just as easy to work as a straight one if a person will stop and think a little. I'll give the readers my rule and then we can see what the difference is. The top diameter of the tank is 60 inches, the bottom diameter 72 inches, or a total of 132 inches. One-half of this is 66 inches, the average diameter. The depth of the tank is 84 inches. Now, "T. M.," get your pencil and a piece of shiplap and work it out this way:

Cubic inches in	66 average diameter in inches.
gallons............231	66 average diameter in inches.
14	84 depth in inches.
	11

This, you see, takes about three minutes to work out. I square the circle by using 11/14, canceling this and dividing the right by the left the answer is 1244 4-7 gallons.

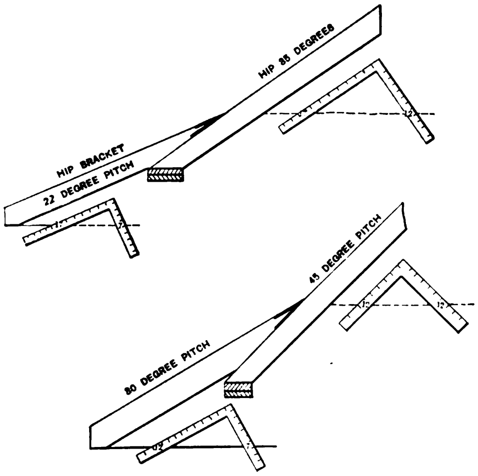
I will now give the readers a tank of my own to figure. What will a tank 6 feet at one end and 8 feet at the other and 5 feet deep hold in bushels of shelled grain? I'll venture to say that half of the Chips cannot work this in a day and get the right answer. My method is this: The two end diameters equal 14 feet when added together and half of it is 7. Now it takes 1¼ cubic feet to make a bushel of shelled grain and the problem will stand like this, always using 11/14 to square the circle, and 5/4 as our new divisor:

$$\begin{array}{r|l} & 7\\ & 7\\ 2 & 5\\ 14 & 11\\ 5 & 4 \quad 2 \times 11 = 22 \times 7 = 154 \text{ bushels.}\end{array}$$



Roof Plan for Two-Story Dwelling.

Now these two rules cover the entire circular tank or bin business. If you want it in bushels of corn in the ear just use 9/4 in place of 5/4 and this gives you 85 5-9 bushels.



Pitch on Pitch Roof.

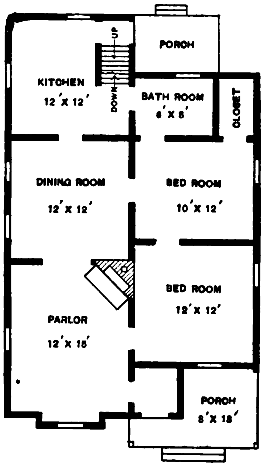
Now, Brother Chips, get right down to business the ensuing year and let us learn all we can and not write so much foolishness. This 10,000 shingle business won't go in Indiana, neither will the 10 to 20 door man get a job where he is known. I would rather do less work of a better quality, then when I go on a new job I don't have to leave the diggins to find them. Give your methods of doing things in your locality and perhaps we can use it somewhere else. If the editor publishes this and you want any more of my short cuts to answers I can furnish you some for lumber measuring.

Roof Plan for Two-Story Dwelling.

From A. H. J. C., *Kennebunkport, Me.*—Having seen the request of "C. K. S." in the April issue asking for a roof plan for a two-story dwelling house, I take the liberty of presenting a sketch which I think will solve his problem. I think the correspondent's house would present a very neat appearance under this roof, although there is an unequal hip and valley, which is shown by the dotted lines at the right. Perhaps some of the readers of the paper can do better in solving this correspondent's problem.

Pitch on Pitch Roof.

From C. W., *Mt. Vernon, N. Y.*—In this section of the country it is customary for architects to draw the roof plans of buildings something after the manner indicated in the sketches which I send herewith for the benefit of young carpenters who are learning the business. The drawings inclosed show a roof where one pitch, say of 30 degrees, is nailed onto the bottom of a 45-degree pitch and also the end of a hip nailed on a 35-degree hip to correspond with the 45-degree pitch. I do not say that this method is new, but I have used it in framing a roof and it is the truest way I can find to do the work. I send it, as it may help some of the younger mechanics out of trouble. It is not intended for the older chips, but if they have anything to say about it I would like to hear from them through the columns of the Correspondence Department.



Roof Plan Wanted for Bungalow.

Roof Plan Wanted For Bungalow.

From F. A. S., *Minneapolis, Minn.*—I inclose a floor plan of a five-room and bath bungalow, for which I would like some of my brothers to send a roof plan. The main roof is to run down over the front porch. The building is a one-story structure, with 10-foot ceiling, and a small room in the attic, with about 8-foot ceiling.

Kerfing Moldings for Circular Work.

From C. T. D., *Tannersville, N. Y.*—Will some of the readers inform me if there is a rule for kerfing moldings and parts around circular work?

Note.—This subject has been discussed in these columns many times in the past and would seem to be pretty well exhausted. If our correspondent will refer to the volume for 1904 he will find a number of methods explained for doing work of this kind.

CONCRETE PILES FOR FOUNDATIONS.

BY "M. D. S.," PITTSBURGH, PA.

An operation which was regarded by architects and builders with a great deal of interest was the driving of about 5000 concrete piles in connection with the foundations of a system of 40 warehouses located between Carson street and the Monongahela River in Pittsburgh, covering an area of 360 x 400 feet. The group of buildings was in reality one structure, but in 40 subdivisions, and it was the first instance in the history of building operations in this city in which the concrete piles were used. It may be of equal interest to the readers of *Carpentry and Building* to give a brief account of the process. The buildings were those recently completed by the Pittsburgh Terminal Warehouse & Transfer Company and the foundation bed under them consists of a layer of filled cinders and earth about 24 feet thick. This "fill" was overlying a stratum of hard pan about 3 feet thick, and beneath this was a bed of sand about 13 feet in depth.

The level of the foundation bed is about 9 feet above the level "pool full" * of the Monongahela River, so that 31 feet of the soil described above contains more or less moisture.

The company named was influenced in deciding in favor of the concrete piles, in part, by the following reasons:

1. Their independence of the moisture conditions of the ground, in this case resulting in the saving of the cost of excavation and masonry for piers, since it was not necessary to drive top of pile "below water level." As may be noted in a foregoing paragraph, the top of the concrete piles was 9 feet above water level. As compared with requirements where wood piles are used there is a saving of the difference over the cost of the 9 feet of piles and the concrete in 340 piers 10 feet 4 inches by 8 by 9 feet.
2. The indestructibility of the concrete pile.
3. Its increased carrying power.

After a careful and competitive test the "simplex" pile, driven by the Crawford Paving Company, seemed best to meet all existing conditions and requirements and was contracted for. The piles were each 16 inches in diameter, and were driven on 3-foot centers, and in groups of 14 to 16 to each pier—340 piers in all.

A cylindrical extra heavy steel tube, with a separate steel or concrete acorn shaped point † with shoulder and tongue to fit into bottom of this tube was used for driving. At the top of the tube was a suitable iron banded driving head of oak ("nigger head"). The pile driver used was about 60 feet high, fitted with a 3200-pound hammer, with a "drop" of from 12 to 15 feet, and the maximum impact of the stroke was 99 tons. The tube was driven until the penetration at the last 15 blows did not exceed 1 inch per blow. After the tube had reached the required depth—35 to 40 feet being the average, 45 feet the maximum depth—the driving head was removed and 3 feet of concrete were deposited in the top of tube by a cylindrical bucket with a drop bottom. The tube was then lifted about 1 foot, and a rammer weighing 360 pounds, properly rigged to top of derrick, was dropped inside to the bottom of the tube, and concrete well rammed. This operation also displaced the steel or concrete "points," elsewhere described, to form the end of the pile in bottom of hole. Another bucket of concrete—3 feet—was then deposited, and the tube lifted or withdrawn 2 feet and concrete rammed. This operation was repeated until the hole made by the tube was filled with concrete and the tube withdrawn entirely.

By keeping 1 foot or so of concrete above bottom of the tube as the tube was being withdrawn the possibility of the sides of the aperture caving in, or of water entering the tube was entirely avoided. At the same time the fresh, pliable mass of concrete, under the rammer, would fill completely the hole left by the tube.

The concrete used for these piles was hand mixed—a fresh "batch" for each pile—and in the following proportions: 1 part cement, 2 parts sand and 5 parts gravel.

The contracting company guaranteed 40 tons as the carrying capacity of each pile. A subsequent test upon four of these piles—3 feet on centers—showed a load of 200 tons sustained for 16 days with absolutely no settlement, levels being noted twice daily for that period. At different points in this foundation, where deep excavations were being made for sewers and tunnel work and where some of these piles were exposed to a depth of 20 feet, they were found to be perfect and most satisfactory in every respect.

It may not be out of place to note here that these highly satisfactory results were due, in a measure at least, to the most careful superintendence given the work, engineers and superintendents from "both sides" watching constantly that the process did not vary from, and that the materials conformed in quality and quantity to the specifications.

---

* From Davis Island Dam.

† At first the steel points were used, but after the operation was fairly started cast concrete points were made, and used as soon as properly hardened.

Novel Experiment in House Building.

What is regarded by English builders as something of a novelty in house construction is found in connection with the erection of a number of concrete cottages in Liverpool. While the undertaking may not impress the American builder with the same degree of novelty as his fellow craftsmen across the water, yet the particulars as furnished by the Liverpool *Courier* may not be without general interest at this time. We quote as follows:

The building, which is three-storied, has been constructed out of material which in the ordinary course of events would probably have been deposited at the bottom of the sea. Clinkers compose the constituent part of the building material. In the first instance the clinkers were crushed and mixed with a proper proportion of cement. The solution was then filled into huge molds and slabs were formed representing a complete wall, floor or roof of a room. The openings for doors, windows, &c., as well as fireplaces and flues, were made in the slabs, which when matured weighed in some cases 11 tons. These slabs were molded at one of the refuse destructor depots and conveyed a distance of two miles to the site. The spectacle of the wall of a room standing upright upon a wagon and being dragged by a traction engine through the streets naturally aroused the public curiosity and consequently there has been an extraordinary interest evinced in the building operations at Eldon street. A huge traveling crane has been employed to place the slabs in their different positions and the care and precautions observed in handling such heavy and cumbersome things may be judged from the fact that not a single accident has occurred. The slabs or walls were first secured together with bolts, then dovetailed and finally cemented. A steel frame has been embedded in the slabs, which have been placed under severe tests and proved sound. The entire work of erection was carried out within six months. The building wears an attractive appearance and presents a remarkable contrast to the adjoining property. But apart from mere attractiveness the tenements are of a perfectly sanitary character and in every way most suitable for the accommodation of the poorest people of the city. There has been an early demand for the tenements, all of which will be occupied at once.

AT the commencement exercises of the Hebrew Technical Institute, held in Cooper Union, New York City, recently, six students were graduated from the wood working class. An exhibit of the work performed by the students was made for two days preceding the exercises in the large hall of the building, where many creditable examples of joinery were shown.

PROTECTION OF PROSCENIUM OPENINGS IN THEATERS.

Directly after the disastrous fire in the Iroquois Theatre, Chicago, his Honor, John Weaver, Mayor of Philadelphia, appointed a commission to examine into the condition of places of amusement in the Quaker City, and in its report it referred in very complimentary terms to the mechanism for operating fire curtains installed in the new million dollar theater of B. F. Keith. This mechanism was the result of competitive plans and was designed by Samuel H. Garrett, engineer and contractor, of Philadelphia. The subject of fire curtains is one which has come into great prominence since the appalling disaster in Chicago, and it may not be without interest at this time to describe the mechanism by which the fire curtain at Mr. Keith's theater is operated, and to quote what the designer has to say thereon.

In his opinion a curtain should have no guides other than the pockets in which it runs. It should hang loosely therein and be provided with rollers at the corners to prevent jamming. There should also be rollers placed on the edge about 6 feet apart to prevent friction in case of an extra strong draft. These rollers should run against the face of the proscenium wall or in the outside of the pocket, depending upon the direction of the draft. Referring to the hoisting mechanism, he says:

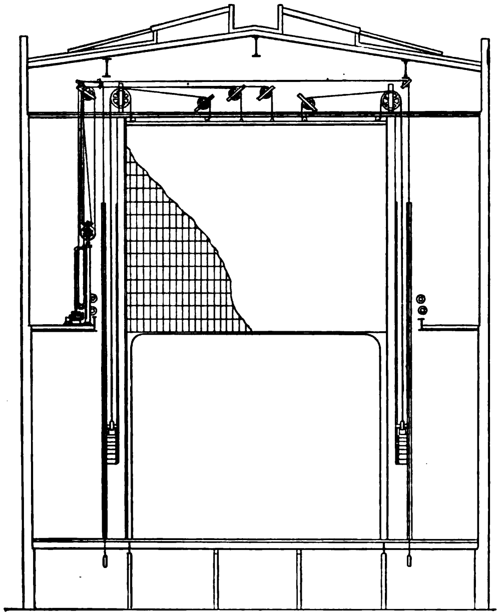


Fig. 1.—Elevation of Fire Curtain with Hoist.—Portion of Inner Section of Asbestos Is Broken Away, Showing Wires to Which the Sheets Are Attached.

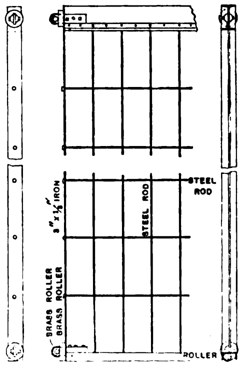


Fig. 2.—Plan of Curtain.

Protection of Proscenium Openings in Theaters.

"The top is an I-beam, which will vary in weight as conditions require. To this beam the hoist cables are attached. The bottom is a 3-inch channel iron, placed with the plat side up and with holes bored every six inches, through which the supporting wires pass, running from the top to the bottom batten and securely fastened thereto. I have stretched ¼-inch wires about six inches apart; the length of these wires is governed by the hight of the proscenium opening. The bottom ends of these wires are threaded and have nuts for compressing the asbestos sheets. On the ends of both the I-beam and channel iron I have placed steel studs, each stud carrying two rollers, so arranged that one roller will work either against the proscenium wall or the inside of the pocket, as the case may be. The other roller is set at a right angle to the first and is intended to roll on the back of the pockets or guide channel running from the upper to the lower studs. Securely attached thereto are two pieces of 3 x ⅛ inch flat iron, one on each side of the curtain. These pieces have holes of proper size, at intervals of 12 inches, through which ¼-inch wires pass from side to side. These wires are fastened where they intersect with the wires running from top to bottom and form a basket work or screen, having a mesh about 12 x 6 inches. On each side of this net are placed blocks of vitrified asbestos, 1¼ inches thick, made up of thin corrugated sheets. The corrugations, placed at right angles, provide ample air space. These blocks are securely fastened together by means of rivets. The blocks on the inner or stage side, having first been covered with tin of standard size, are joined together with a lock seam such as is required by the Board of Underwriters. The blocks on the outer or audience side are covered by an asbestos cloth, the same as now used in ordinary curtains. The sag or stretch is taken up by a roller placed in the hollow of the 3-inch channel iron at the bottom. This roller extends beyond the flange of the channel iron and forms a cushion, against which the curtain strikes as it descends, and it also adapts itself to the inequalities of the stage, forming thereby a seal, which in connection with the weight of the curtain (at least 1000 pounds) produces a friction which enables the curtain to resist pressure likely to be exerted against it.

The whole forms a protection flexible enough to adapt itself to any ordinary settling of the proscenium wall and yet strong enough to resist any force other than falling structural iron or timbers, and by reason of working loosely in channel guides perfectly smooth inside. It is suspended by metal cables, all of equal length and not likely to jam or get out of alignment and at the same time not excessively heavy—that is, a curtain 36 x 36 inches would weigh about 9000 pounds.

The illustrations which are presented show in Fig. 1 an elevation of the fire curtain, with hoisting mechanism, a portion of the inner section of the asbestos being broken away so as to show the wires to which the sheets are attached. In Fig. 2 is a plan of the curtain, while in Fig. 3 is a section one-half full size, clearly indicating the construction employed. The hoisting mechanism, it may be mentioned, consists of a hydraulic cylinder operated by an electric driven plunger pump.

◆

"New York City promises to be a wonderful place when the architects get through with it," said the layman who had taken a long walk on Sunday afternoon, "and there will not be a period of domestic architecture unrepresented before long. We had French houses for ten years and it began to look as if there would never be anything else. Then we were Georgian, and it seemed as if we would be a slice of London and a slice of Paris, like lean and fat in the bacon. Now we are going to have Adam houses, and London will win out until some firm

starts to put up Venetian palaces. Then there are the unclassified houses which are Queen Anne up to the second story and Mary Ann the rest of the way. I confidently expect to see the old brownstone welcomed back with enthusiasm."

Trade Unions May Not Coerce Their Own Members.

In line with the disposition of the courts as asserted in a number of decisions in recent years, to subject labor unions to the payment of damages for injury done to the business of an opposing employer, is a decision given a short time ago by the Supreme Court of Pennsylvania. The original case was brought by S. G. Purvis & Co. against Local 500, United Brotherhood of Carpenters and Joiners of America, *et al.* Besides affirming the liability of a union for damages because of its unlawful acts the decision is of great interest in that it holds unlawful certain acts of unions which the latter have engaged in with impunity, and to an extent undermines the foundations of union power by denying the right of the union to compel its members to obey orders directed against the business of a noncompliant employer.

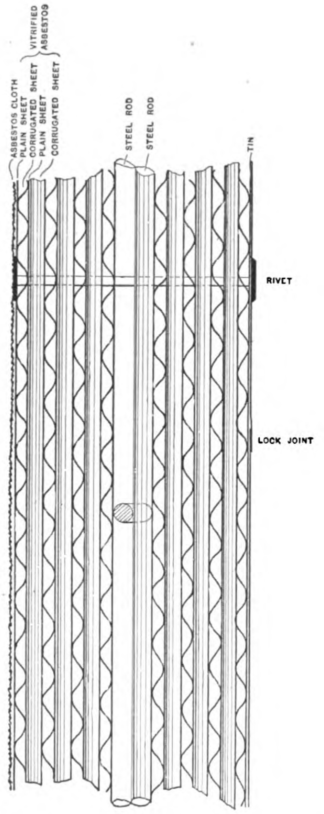


Fig. 3.—Section of Curtain One-Half Full Size.

Protection of Proscenium Openings in Theaters.

S. G. Purvis & Co. operate a sash, door and blind factory and planing mill and lumber yards at Butler, Pa. They refused to unionize their shops. Local 500 put the firm on the "unfair" list. The District Council of Pittsburgh, Allegheny and Vicinity of the United Brotherhood of Carpenters and Joiners followed this declaration by putting a boycott on the firm and its product. It also, by use of the union label, caused members of the union to reject material coming from the mills of the plaintiffs. Work was stopped on certain buildings, the men being called out because material was being secured from S. G. Purvis & Co. These things were done after agents of the union had told members of the firm that if they did not agree to operate a union shop the only alternative was to quit business, as the union intended to inflict injury upon them if they persisted in their determination to run an open shop.

The result of the trial in the Court of Common Pleas of Butler County, Pa., was the issuance of an injunction against the defendants and the assessment against them of damages to the amount of $1770 sustained by the plaintiffs because of the stopping of work, by order of the union, on contracts in which the firm's material was being used and because of the boycott ordered. The injunction was definitely directed against practices which the unions have in many cases carried on without let or hindrance, particularly ordering their members to take steps inflicting injury on the business of an employer. After enjoining the union from circulating notices of its boycott on the plaintiffs, and from requesting customers or prospective customers to have their work done by union mills, as well as interfering with the business of persons purchasing material from the plaintiffs, the court's order makes this special reference to orders given by the union to its members:

> Or from interfering and from combining, conspiring or attempting to interfere for said purpose with the business of the plaintiffs, by the enforcement under pain of penalties and forfeitures, of Rule 7 of the working rules adopted for the government of local unions under the jurisdiction of the Carpenters' District Council of Pittsburgh, Allegheny and Vicinity, United Brotherhood of Carpenters and Joiners of America, which provides that "No member shall be allowed to work any material coming from any nonunion mill, and shall comply with this rule when the local unions are so informed and instructed by the District Council," or by other like coercive rules, the natural and necessary effect of which would be to deter the members of said trades unions or others from working upon buildings or other constructions to which the plaintiffs were furnishing materials, or contractors, builders or owners of said buildings or other constructions, or others, from purchasing materials from the plaintiffs; or from interfering or from combining, conspiring or attempting to interfere with the business of the plaintiffs for the purpose of injuring them in their business by the enforcement of fines or forfeitures, suspension or expulsion from membership in any of the locals within the jurisdiction of the Carpenters' District Council of Pittsburgh, Allegheny and Vicinity, United Brotherhood of Carpenters and Joiners of America, for failure to observe Rule 7 of the working rules adopted for the government of local unions under the jurisdiction of said Carpenters' District Council of Pittsburgh, Allegheny and Vicinity, United Brotherhood of Carpenters and Joiners of America, or for failure to observe any of the rules adopted and in force in that union, or that may hereafter be adopted, which would be coercion of said members interfere with the business of the plaintiffs, or from otherwise restraining, coercing and intimidating any one or more of the members of said union for said purpose from working for any contractors, builders, owners or other persons because they are doing or desire to do business with the plaintiffs; or from interfering and from combining, conspiring or attempting to interfere with the business of the plaintiffs by the issue of union labels to any mill within the jurisdiction of the Carpenters' District Council of Pittsburgh, Allegheny and Vicinity, United Brotherhood of Carpenters and Joiners of America, such issue of labels being made for the purpose of interfering with the business of the plaintiffs. From the doing of any and all of which acts and things for the purpose of injuring plaintiffs in their business and thereby compelling them to unionize their mill or have such injury continued, the said defendants, each and every one of them, their officers, committees, agents, employees, servants, members, associates and all others that may act in concert with them, or by their direction, are hereby enjoined and restrained.

In every particular the Supreme Court decision of March 19 affirms the above finding of the Common Pleas Court and thus definitely puts bounds to the authority of a trade union over its own members. The Supreme Court says of the contention of the union that it sought only to persuade and not to coerce, that "their means of persuasion are the destruction of the property of those whom they would persuade. Coercion may be accomplished without threats or violence, and the attempt to so accomplish it was made in this case." The Supreme Court says that "the members of Local No. 500 who were found working material from their [plaintiffs'] mill were coerced by the compelling power of the union to quit work on pain of trial, fine or expulsion, with its attendant annoyance and possible ostracism in case of their refusal. . . . The principle upon which the cases, English and American, proceed is that every man has the right to employ his talents, industry and capital as he pleases, free from the dictation of others, and if two or more persons combine to coerce his choice in this behalf it is a criminal conspiracy."

CENTERS FOR ARCHES OF DOUBLE CURVATURE.*—VI.

By Charles H. Fox.

We will now proceed to show in connection with the diagrams in Fig. 18 the practical application to our subject of the development of prisms, intersection and angles made between planes, and the intersection of cylinders with planes. In the construction given in Fig. 8 it may be noted that for the base of the cylinder, which there formed a plan, we adopt a base such as may be obtained in the plan of a radiant arch. The ends of the prism are there placed over radial lines, both of which radiate toward the plane center O.

In the representation of the cylinder given in 3 2 1 D 6 F of Fig. 18 we have adopted a somewhat different form of base. As will be noted the end over C D of the prism, which incloses the cylinder, is drawn parallel with the center line or end over O F A. This is the position which obtains on the plan of the cylindro-cylindric arch.

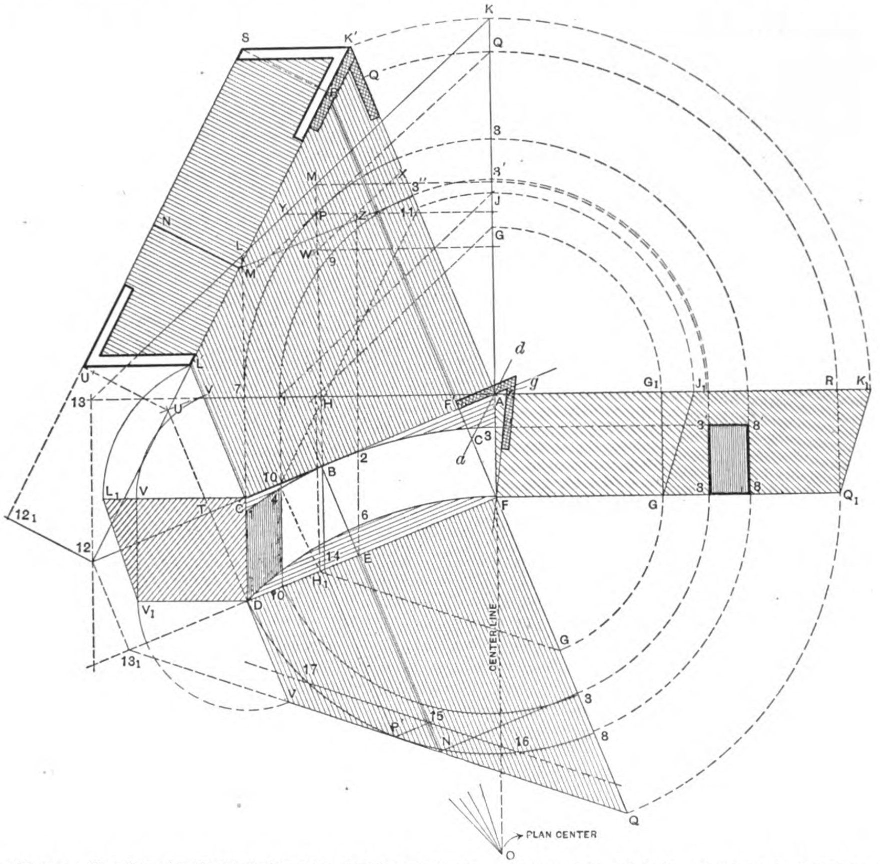


Fig. 18.—Diagram Showing the Construction of a Cardboard Representation of the Solid of a Plank, Out of Which May Be Formed the Head or Sash as Required at a Cylindro-Cylindric Arch.

Centers for Arches of Double Curvature.—VI.

The principal reason for taking this form of base is that we promised in an earlier chapter to prove to the readers that the methods as generally taught by means of which the thickness of the plank may be obtained were erroneous, and as the angle made between the level elements which belong to the exterior bounding surface and that of a line which may be in a level position at the top surface of the plank is greater in the cylindro-cylindric or in the cylindro-conic arches than in the corresponding elements of the radiant arch we have here in the construction of the representation of the projections of the first-named arch a much better opportunity of proving the assertion earlier made and at the same time show the correctness of the methods of the writer, by means of which is determined the outer size of the plank, out of which a rib comprising one-half of the head or sash may be formed.

As already explained in considering the arches from a geometrical standpoint it should always be borne in mind that two of its faces are portions of vertical cylindrical surfaces revolving about or around the same axis. It is therefore obvious that the best position that may be given to the plank is one which will contain one or more of the vertical elements which belong to the cylindrical surface of the face. It is only in a very few examples that the width of the plank will be greater than its thickness. Geometrically the face of the plank may be considered as a plane, tangent to one of the rectilinear elements of the face of the cylinder, which forms the outer face of the wall. This position will in the plans which follow be the one assigned to the face of the plank. Another point is that we shall always assume, unless otherwise noted, that the top and under surfaces of the plank are to be made at right angles to the surface which forms the face. This is the most economical manner of preparing the plank, both as regards labor in "squaring" it up and in the quantity of material required to form the head or sash.

Let us again suppose that the curve lines 3, 2, 1, D, 6, F of Fig. 18 represent the base of a hollow cylinder, the curve lines being drawn with the center O. As this represents the plan of the cylindro-cylindric arch, the line O F A will represent the center line of plan;

---

3 4, that of the half opening; 4 1, that of the width of the sash at the face. We have at length explained in the construction of a preceding diagram that the elements of the soffit of this form of arch are "parallel," so that by producing 4 5 10, and C 1 D, respectively, parallel with the center line O A, we may obtain at the plan, the projections giving the intersection of the sash with the horizontal plane represented in the line A 13 above. Properly speaking, the line C 1 D, is the horizontal projection of the element which belongs to the point 7 of the exterior bounding surface, as given in the elevation above. Now let the cylinder be inclosed in the prism represented in A C D F. Then from the points given in 4 1, parallel with the center line, reduce lines as shown in 4 I, and 1 7 above. Then through the point given in A, square with the center line, draw A 13. This done, with A as center and A I as the radius, draw the curve line I 9 3′ of the soffit. Then with point A again as the center, and A 7 as the radius, describe the curve 7 P 8. We may here remark that the line just drawn is not the true projection of the exterior bounding surface; but we have adopted this method of drawing the line on account of its simplicity, and will later on show and explain the method by means of which the true projection may be given at the elevation plane.

Thickness of Plank.

We will now proceed to ascertain the thickness required of the plank, following the methods of construction as given in the printed works of other authors. First, at about the center point of the curve, as that of P, parallel with the center line O A K, produce a line as that shown in M P 14, this gives the vertical projection of an element which belongs to the exterior bounding surface, which meets the cylindrical surface of the face in the point P. This element is a "level" one—that is, the point as given in P may be taken as the projection of a line, which in space is parallel to the horizontal plane; therefore, the element is said to be a "level" one; and, if a line be drawn at the finished surface of the sash, so that it may occupy a position corresponding to that of the line in question through P, when the sash may be placed in its proper position at the wall, the line thus drawn will be found to be a level one, if the work has been properly executed. From this remark it may be clearly seen that by erecting a line as that of 14 P′ below, square with F D; the point given in P′ must be at a vertical hight above the base line F D, equal to that given in H P above. This is the condition that must of necessity obtain in order to have sufficient material out of which to form the finished solid of the sash or head. The point P′ is, therefore, the vertical, and the line B 14 the horizontal projections of a level line in space. Now, from the properties which planes have in general, we know that the position of a "level" line which may be found at the oblique top surface of the plank will be that at right angles with the surface of the face; and as the line A C is the horizontal trace of the face of the plank, it follows that by drawing B E through B at right angles with A C we may obtain the horizontal projection of the line in question. Now, if a line as that shown in E N be drawn square with the base line F D, and the length E 15 be made equal to that of H P above, we may obtain in the point given in 15 that in which the line which belongs to the top surface of the plank intersects the back surface of the plank, that over F D. Assuming the line Q V as that of the inclination of the top surface of the plank, by drawing 16 17 through 15, parallel with Q V, we supposably obtain the projection of the top surface of the plank at its intersection with the back surface of the plank. But D P′ 8, as here shown, is the properly developed projection of the intersection of the exterior bounding surface with that of the auxiliary vertical plane which forms the back side of the plank; and as clearly shown in the line 16 17 has cut off a portion of the surface, that contained between the points in question. This is just what happens in practice when such misleading methods of constructions are followed in endeavoring to obtain the position of the top surface of the plank and that of its thickness; for, although the plank would be of sufficient thickness as might enable us to form the required contour at the convex surface of the sash, yet at the concave face there would be a want of material equal to that shown in that portion of the diagram included in 16 15 17 P′ 16; so that in order to complete the contour of the sash at the inside face a piece of stuff equal to that shown in the figure would have to be spliced on to the plank; this we all know is hardly the proper manner in which to get out a first-class job, especially when by observing proper rules and methods the work may be got out in proper shape and in far less time than required by "rule of thumb" methods.

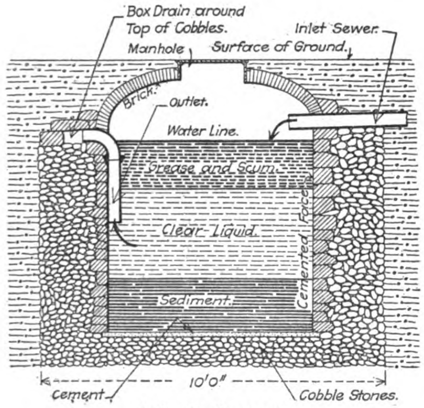
Now to show the correct method of ascertaining the thickness of the plank: First, through the point given in P of the vertical elevation, parallel with A 13, draw Y P Z indefinitely; then square with A C draw through B a line as M′ B N indefinitely. Now at the point given in E, parallel with the center line, draw E Z. Then tangent with the curve, through the point given in P, draw P Q. For the benefit of the beginner we may explain that a tangent is a line which may be drawn at right angles with the radius at the point in question. Thus, P Q may be drawn square with a line joining A with P. This done, parallel with P Q draw W Z X. Now make P M equal with P W, or P Y may be made equal with P Z. Then through the point given in M, parallel with P Q, draw K L 13. Then through I draw I J parallel with 13 K. Now square with A C draw F′ F produced, and 10 H,. Now parallel with the center line draw 7 L and H, H. Then parallel with L K draw H G. We have now projected in the figure 7 L K G H 7, the elevation of the plank such as obtains at the vertical plane of projection, of which the line A 13 is the ground line. It may now appear to the beginner that the proper thickness and size of the plank is now given in the diagram of the figure in question. However, such is not the case; the true thickness and size of the plank may be obtained only at an auxiliary vertical plane, such as that projected in the shaded diagram at the left of the drawing. The reason of this has been fully explained in connection with Figs. 1 to 7, for the lines A C and L K are oblique with the planes of projection.

Obtaining True Size of Plank.

Now to obtain the development giving the true size of the plank: First produce A C indefinitely; then square with A C draw A K′, C L′ and D T U. Square with A 13 draw 13 12 and make A K′ equal to the length of the corresponding line of the elevation plane, and join K′ 12. Parallel with K′ 12 draw 10 11. The true size, as required at the face of the plank, is now given in the figure contained within the lines 10 T, U K′, 11 10. The shaded portion shown in A C L′ K′ A gives one side of the model illustrating the correctness of the constructions. To complete the other sides of the model: Square with F D draw F Q and D V; make the length of these equal to that of the corresponding projections A Q and T U above. Draw V Q. Now square with C D draw C L, and D V,; make the length of these respectively equal to that of the corresponding projections over the points C D. Draw L, V,. Now square with A F draw A K, and F Q,; make the length of these equal to that of the corresponding lines over A F. Draw K, Q,. The section of the plank at the end of the model over A F may readily be projected, as follows: Set off A G, J, equal to that of the corresponding projections of the center line, then square over G, G; now join J, G,. and the section of the end of the plank may be projected. In a similar manner may the section of the sash or head be obtained. Square with A F draw 3 3′ 8′. Set off the length of these equal to that of the corresponding projections of the center line A K. Then parallel with A F draw 3′ 3 and 8′ 8, and the section of the sash may be obtained. Now with the point F as the center, rotate the point G of the end of the model, into the corresponding point of the back face and parallel with V Q draw H, G. If the drawing has been correctly made the line just drawn will meet the point already given in H, of the plan. We have now to develop the section as given at the oblique top surface of the model. To do this square with K′ L′ draw R S, M′ N and U U′. Make R S equal with F′ F of the plan.

Then parallel with K′ L′ draw S U′; now joining S R, on U′ L, and the section required may be developed.

Now, take a sharp knife and cut through the board at the outline of the drawing; then at the lines A C, C D, D F, F A and L′ K′, cut about half through the board; then with the lines at the exterior fold the sides into their required vertical position over the plan; then fold over the section plane of the top, and the model may be completed. If the drawing has been correctly made, and the model folded together in a proper manner, on inspection the line M′ N, of the top surface, will be found in a level position, and the top surface at right angles with the face surface. Also at the back face of the model the line H P will be found of a length equal to that given in H P of the line first drawn at the elevation plane. This proves that the plank is only of a sufficient size at the back to contain the contour of the head, or sash, at its concave face, and shows conclusively that had the line 16 17 been drawn and the model constructed to its direction, then, as stated above, the plank would not be large enough to contain the finished solid of the sash in its entirety. This should show clearly to our readers how very essential it is that the projection of molds, &c., as are required daily by the workman, for the solution of the many problems which he encounters, should show him that these projections and developments should be founded upon geometrical principles, instead of following some " rule of thumb " method.



A Septic Cesspool.

The side bevels are shown constructed at the section plane of the top surface; on trial the angle at either bevel will be found equal to that at the other; only at their application, the acute angles of the bevels are to be reversed—that is, at the end over A F, the acute angle is toward the outer face, while at the end over C D the acute angle is toward the inside face. The method of constructing the angle of the bevel is shown also at the plan. First, parallel with L′ K′ draw *a d;* then square with A C, draw F′ F; make F′ *g* equal with *c* A; then joining F with *g*, and the angle contained at the bevel may be developed. Now in reference to the curve lines 10 3 and D P′ 8 drawn at the back face of the model at our drawing, we may state these are elliptical curves, and are the curves of intersection of a cylinder with a plane oblique to its axis.

◆

A Septic Cesspool.

The cesspool does not furnish, as commonly constructed, an ideal method of sewage disposal, but it is still largely used to dispose of wastes from private houses in the country and small villages. From the landlord's point of view its greatest objection is its liability to clog and become water tight. This may take place in a very short time in tight soils or in fine sand. The bottom soon becomes choked with sediment and grease and the water line rises, thus bringing fresh surfaces around the sides in use. These gradually clog with floating soap and grease, forcing the water line higher and higher until the pool is full and almost water tight, when the only remedy is the building of a new one.

The accompanying sketch, reproduced from the *Engineering Record*, shows a septic tank and leaching pool in the one construction. The aim of the design is to arrest the sediment and scum and bring only comparatively clear liquid in contact with the absorbing surfaces, thereby prolonging the life and usefulness of the cesspool. By proportioning the tight inner chamber so as to have a capacity for about 36 hours' output septic action may, it is stated, take place without purification and the attending odor and gases. The construction, as shown in the sketch, does not entail any large additional first cost. The design has been made by Fred. K. Betts, assistant engineer of the Department of Water Supply of New York City, who has charge of the sanitary patrol of the Croton watershed.

◆

An Old Broadway Landmark.

For many years the old style six-story iron front Gerry Building, at the corner of Broadway and Warren street, New York City, has been one of the landmarks of Broadway, but it has finally had to succumb to the onward march of improvement, and workmen are busily engaged in preparing the site for a modern 12-story brick office and store building, which will cost in the neighborhood of half a million dollars. According to the plans of the architect, James B. Baker, the new building will have a frontage on Broadway of 75 feet and a depth on the side street of 142 feet, with a spacious light court on the northern side. The lower stories are to be of granite and limestone, and the upper ones terra cotta trimmed brick. It will be called the Smith-Gray Building by reason of the fact that this concern has leased the big stores for a term of years.

Plans were recently filed with the Bureau of Buildings for remodeling the six-story structure at the corner of Broadway and Park place, owned by the General Society of Mechanics and Tradesmen. The ground floor will be fitted for stores and the upper floors will be divided for offices. The architects of the improvements are Jackson & Rosencranz.

◆

Saw Mills in England.

When attempts were made to introduce saw mills in England they were violently opposed, because it was apprehended that the sawyers would be deprived by them of their means of getting a subsistence. For this reason it was found necessary to abandon a saw mill erected by a Dutchman near London in 1663; and in the year 1700, when one Houghton laid before the nation the advantages of such a mill, he expressed his apprehension that it might excite the rage of the populace. What he dreaded was actually the case in 1767 or 1768, when an opulent timber merchant, by the desire and approbation of the Society of Arts, caused a saw mill, driven by wind, to be erected at Limehouse under the direction of James Stansfield, who had learned in Holland and Norway the art of constructing and managing machines of that kind. A mob assembled and pulled the mill to pieces; but the damage was made good by the nation, and some of the rioters were punished. A new mill was afterward erected, which was suffered to work without molestation, and which gave occasion to the erection of others. It appears, however, that this was not the only mill of the kind then in Britain, for one driven also by wind was built at Leith some years earlier.

◆

THE TOTAL AMOUNT OF TIMBER now standing in the forests of the United States is estimated at 1475 billion feet, but the annual cut per year is 45 billion feet, which would mean the total destruction of the forests in 35 years, not counting any increase in the cutting. In this connection it is interesting to observe that the building trades in this country must shortly look toward a substitute for wood in many of the operations, and it is considering, too, the advancement that has been made in sheet metal stamping it is not unlikely that sheet metal of various forms will be more largely used here that concrete is playing such an important part.

WHAT BUILDERS ARE DOING.

The leading contractors connected with the building and allied industries in the city of Alton, Ill., perfected an organization on the evening of May 26, to be known as the Alton Builders' Exchange, and decided upon quarters in the Davis Building. A constitution and by-laws were adopted and business of interest transacted. The organization starts out with flattering prospects and much good is expected to result from its formation.

The officers elected for the ensuing year are: President, Samuel Springer; vice-president, O. H. Gent; secretary, R. H. Richards, and treasurer, A. J. Degenhardt.

Alanta, Ga.

That building operations are active in and about the city of Atlanta, Ga., is evident from the fact that the permits issued from the office of Building Inspector F. A. Pittman for the first five months of the present year show an increase of nearly $1,000,000 in value over the corresponding period of last year. The gain has been continuous since the first of the year, and for May the value of the improvements for which permits were issued was $587,861, as against $408,739 in May of last year. Some of the important operations under way are the new St. Luke's Episcopal Church, a new medical college, the Terminal Hotel and the Christian Church.

Baltimore, Md.

A very interesting feature of the important meeting held on June 5 by the members of the Builders' Exchange, Baltimore, was the report of the Committee on Permanent Exposition, which was read by Chairman Albert D. Klein of J. The report referred to the numerous exhibits that have been set up in the department and the success promised. The department opened Monday night, June 11, which was known as "architects' night." The report stated that exhibits of nearly every material have been installed and that contracts for others are in the hands of the manager of the department, I. H. Scates.

The election of officers for the ensuing year resulted as follows:

President, Theodore Mottu.
First vice-president, Theodore F. Krug.
Second vice-president, Joseph T. Lawton.
Third vice-president, Frank G. Boyd.
Secretary, Albert D. Klein of J.
Treasurer, B. F. Bennett.

Directors: Walter E. Burnham, John S. Bullock, Jr., A. J. Dietrich, Harvey Middleton, F. S. Chavannes, John K. How, J. E. Stanfield, H. H. Duker, C. M. Macklin, Frank G. Walsh, George W. Walther and Daniel A. Leonard.

The election of officers brought about a new office. John M. Hering, who has served so successfully as secretary for many years, was elected superintendent, this office being created, and Mr. Klein will occupy the office of secretary for the next year. Mr. Hering will be just as active in the inner affairs of the exchange.

Chicago, Ill.

Building continued active in Chicago during the month of May. Permits were taken out for the construction of 1035 buildings, fronting 27,737 feet and costing $6,252,720. Last year during the same month permits were issued for 775 buildings, with 21,139 feet of frontage and costing $3,813,710. Permits were taken out for the first five months of this year for 4172 buildings, with a frontage of 113,182 feet and costing $30,997,645, as compared with 2920 buildings, 91,700 feet frontage and $22,549,065 in cost for the same period in 1905. Among the line of the active building boom is the enormous amount of school building construction which is being planned. The preliminary report plans for an expenditure of $2,551,987.97 in new structures, and other new schoolhouses are being considered which will probably bring the total above $3,000,000 before the end of the school year.

Indianapolis, Ind

The members of the Builders' Exchange recently celebrated the opening of their new and commodious quarters in the New Castle Hall Building in East Ohio street, which have been fitted up to meet the requirements of the organization. There are suites of 12 rooms and a large assembly hall through which the visitors were shown and special features explained to those interested. After the members and their friends had enjoyed a sumptuous banquet there were interesting remarks by Governor Hanley, Major Bookwalter and John J. Twinam, president of the Builders' Exchange. The latter gave a brief history of the organization and predicted a rapid growth for the city of Indianapolis during the next ten years.

Jacksonville, Fla.

The members of the Builders' Exchange held a social session on the evening of Monday, May 21, in celebration of the first anniversary of the organization. About 75 members of the exchange and invited guests assembled in the Auditorium, opposite the Consolidated Building on East Bay street, and from 9 o'clock until midnight enjoyed the good things which had been provided for them both in the way of refreshments and interesting addresses by leading members and guests. After the cigars had been passed around H. H. Richardson, president of the Builders' Exchange, extended a welcome to those present, and then introduced George B. Gilkes, who spoke on the subject, "Relations Which Should Exist Between Architect and Builder." He handled the subject from the standpoint of the architect, and what he had to say was received with well merited applause. President Richardson then introduced William T. Cotter, an architect, contractor and builder well known throughout Florida, and who has successfully carried through some of the greatest projects in the building and construction line ever undertaken in the State. His address was along the same lines as was that of Mr. Gilkes, but from the builder's standpoint.

Following Mr. Cotter's address President Richardson introduced G. P. Hall, who was assigned the toast "The Builders' Exchange; What It Stands for and What It Has Accomplished." This was an address of great interest, not only to the members, but to the invited guests. It was in part historical and in part prophetic, and what he had to say was followed with the closest attention. Upon the conclusion of Mr. Hall's address President Richardson made a few remarks upon the pleasure which had been afforded all in listening to what the speakers had had to say and announced that the exchange would arrange to have the addresses printed in pamphlet form for distribution among the members. Each and all present thoroughly enjoyed the occasion, and the anniversary of the Builders' Exchange was voted an unqualified success.

There is at present a movement on foot to form a Southern association of builders' exchanges, with which all the local associations will be affiliated.

New York City.

Building operations in the city have not as yet been very seriously handicapped by the trouble growing out of the refusal of the Brooklyn journeymen carpenters to accept the decision of Judge Gaynor, to whom was referred for settlement the question of an increase in wages. It appears that when the Master Carpenters' Association of New York City made an agreement in December last to advance wages the scale was $4.50 a day in the Borough of Manhattan and $4 a day in Brooklyn, and the terms of the agreement fixed the minimum wage of carpenters in Manhattan Borough for work in the shop at $4 a day and on buildings at $4.80 per day and that there should be a "proportionate increase per hour in the other four boroughs." The scale in force at the time the agreement was made was to continue until July 1, 1906, when the increase was to take effect. It is stated that the Brooklyn men attempted to force the wage scale to $4.50 a day in that borough prior to July 1, and then through the medium of the agreement referred to secure the 30 cents a day additional, which would have made the wages in the Borough of Brooklyn after July 1 $4.80 a day, the same as in the Borough of Manhattan, whereas the agreement demanded different scales for each borough, as has always been the case, to compare to the different scale of rents and cost of living in the boroughs.

Judge Gaynor decided that the scale of wages prescribed and established in each borough prior to the time the agreement was made must remain unchanged until July 1 and that then the same increase per hour in terms by the agreement for Manhattan should go into effect in all the boroughs.

As the Brooklyn carpenters would not recede from their position the Board of Governors of the Building Trades Employers' Association took drastic measures and locked out the carpenters belonging to the Brotherhood of Carpenters and later those employed by the Master League of Cement Workers.

The case of the painters who are on strike against the Master Painters' Association and the interior Decorators and Cabinet Makers' Association of Manhattan is much the same as that of the journeymen carpenters. This strike is the result of a decision recently rendered by Charles Stewart Smith as umpire in regard to demands for higher wages. The demands were for an increase in wages from $3.50 a day for plain painters and $4 a day for decorative painters to $4 and $4.50 a day, respectively, with a new wage scale for paper hangers. The Brotherhood is under the Arbitration Agreement of the Building Trades Employers' Association and the unions and the demands therefore were refered to a special Arbitration Committee of employers and employed. The committee failed to agree and the matter was referred to Mr. Smith as umpire, his decision to be final. He decided that the plain painters and decorative painters should hereafter receive a wage of $3.50 a day—a reduction instead of an increase for the decorative painters—and that the wages of the paper hangers should be un-

changed. The strike therefore is a violation of the Arbitration Agreement.

At the time of going to press it is difficult to foreshadow the outcome or to indicate the extent to which building operations may be tied up. Here and there indications are not wanting of a check to construction work, but it is more largely due to the high prices of building materials than to the attitude of labor. The value of the improvements for which permits have thus far been issued is somewhat in excess of the corresponding period of a year ago, although in the Borough of the Bronx, where tremendous activity prevailed in 1905, there is a perceptible falling off. The same may be said of operations in the Borough of Brooklyn, although the decline is not altogether significant.

Since the ab.ve was written an agreement has been reached between the Master Carpenters' Association and its workmen whereby the latter will return to work June 18. The men in Brooklyn will receive $4.50 per day and the men in Manhattan $4.80 per day. The new wage scale of the Brooklyn men will go into effect August 15 and that of the Manhattan men on July 1.

Philadelphia, Pa.

The report of the Bureau of Building Inspection for the month of May shows an increase in the total value of building operations, when compared with the previous month, as well as a substantial increase over the corresponding period in 1905. Operations during May showed a decline when compared with April, but their individual cost was greater. Permits to the number of 990 were issued by the bureau during May, covering 1895 operations at an estimated cost of $4,886,655, an increase in value amounting to $814,770 over the previous month, while comparisons made with the month of May last year show the gain to be nearly $500,000 in the past month's favor.

There has been a further decline in the number of permits taken out for two-story dwellings, while those for three and four story dwellings have increased, the total values showing a loss of a little over $500,000. The erection of buildings for manufacturing purposes has increased largely, but still falls somewhat behind the month of March, when their total value reached over $500,000. Alterations to existing buildings showed a decided increase, amounting to almost $500,000 when compared with those of the previous month, while gains were also made in the number of permits taken out and estimated value of club houses, schools and apartment houses.

Building operations are being pushed forward rapidly in all sections of the city, and the trade has never experienced more active conditions. Every branch of the trade is fully occupied, and extraordinary efforts are being made to push operations to completion. Building materials are hard to obtain promptly and considerable delay has been experienced by builders and contractors on this account.

The labor situation is good, the few minor differences, held over from early in May between employers and employees having been amicably adjusted. The demand for skilled workmen is large. In some branches of the trade mechanics are scarce, particularly those employed on the better grades of work, and from the amount of work begun and in contemplation the demand for good men is more likely to increase than diminish as the season advances.

Among the prominent building operations for which permits were taken during the month of May was one for 30 two-story houses to be erected in West Philadelphia by S. Greenburg. These are all to be 15 x 51 feet, and the cost of the operation is estimated at $60,000.

The Racquet Club will build a new club house in Sixteenth street, below Walnut, at an estimated cost of $500,000. Permits for this work have been granted by the Bureau of Building Inspection.

Frank K. Stahl will erect 16 two-story houses and a three-story store and dwelling in Germantown, to cost $35,000. The dwellings average 16 x 47 feet each, while the store is to be built on a lot 16 feet 4 inches by 62 feet.

John L. Fry has begun work on 22 two-story houses, 15 x 42 feet each, at 5111 to 5153 Walton avenue, West Philadelphia. The operation is to cost $48,400.

Pittsburgh, Pa.

Whether or not it is due to the high prices of materials entering into building construction, the fact remains that there is a distinct let-up in the building operations which are just now being conducted in the city, as compared with the same time last year. According to the report of Superintendent S. A. Dies of the Bureau of Building Inspection there were 174 permits issued for new buildings during the month of May, estimated to cost $766,100, while in the same month last year 362 permits were issued for building improvements costing $1,434,710. The cost of alterations in May of this year was $57,356, and in May last year $83,976. Whether this ratio will continue through the season it is difficult to say, but there is enough work under way and in prospect to keep the different branches of the trade pretty well occupied. A feature of the situation is the extent of the improvements which are being made and in contemplation in the business section. Among the new structures downtown which are said to be assured for this year's erection, may be noted the following:

Union Bank Building, Wood and Fourth........	$1,000,000
Commonwealth Building, Fourth avenue.........	1,000,000
Berger Building, Fourth and Grant..............	500,000
Phipps Power Building, Duquesne way...........	800,000
First National Bank Building, Wood and Fifth...	500,000
Century Building, Seventh street................	400,000
Kaufmann warehouses, Wood street.............	150,000
Oliver Building, Liberty avenue................	100,000
Excelsior Building, Liberty avenue..............	125,000
Arnfeld Building, Penn avenue.................	75,000
Gloekler Building, Penn avenue................	150,000
Arundel Building, Ninth street.................	75,000
Myers remodeling, Oliver avenue................	100,000
R. C. Hall Building, Fourth avenue.............	50,000
Thaw Building, Smithfield and First............	150,000
Woodwell Building, Wood and Second...........	75,000
Keenan Building, Seventh and Liberty...........	1,000,000
Nicola Building, First and Cherry..............	125,000
Philadelphia Company annex, Sixth avenue......	150,000

Outside the business district a number of large factories and manufacturing plants, as well as other buildings involving a considerable outlay of money, will be erected. The plant of Reymer & Brothers, Incorporated, at Forbes and Pride streets, will cost $200,000, and the catering building of W. R. Kuhn & Co., at North Highland avenue and Broad street, will cost $200,000. The plant of the Pittsburgh Gage & Supply Company, at Liberty avenue and Thirtieth street, will cost $250,000. The Emory Methodist Episcopal Church will spend at least $150,000 for buildings at North Highland avenue and Rippey street, and a half dozen churches have announced building projects whose cost will exceed $100,000. The number of store buildings which will cost from $25,000 to $75,000, is larger than usual and these are well scattered over the city.

Architects and contractors report the number of first-class houses costing from $10,000 upward, which are assured for this summer, is larger than was anticipated earlier in the year. Probably fewer flat buildings will be erected this summer than a few years ago, owing to the fact that there appears to be a surplus of high-priced apartments.

It is understood that arrangements have been completed for the erection of a 24-story store and office building, involving an outlay in the neighborhood of $3,000,000. It will have a frontage of 216 feet on Smithfield street, extending from Oliver avenue to Sixth avenue, and the depth will be 120 feet.

Another improvement in the near future is a 19-story hotel, to be erected at the northeast corner of Smithfield street and Seventh avenue, and to cost, with its furnishings, in the neighborhood of $4,500,000. The first 40 feet of the building above ground will be faced with granite, while the remainder will be of brick. The hotel will contain 700 rooms, and the furnishings will be such as to make it the rival of the finest hostelries at present in the country.

Pensacola, Fla.

The building outlook for the present season is regarded as very promising, but as the workmen are divided, being part union and part nonunion, contractors do not always have all the men required, and there is a good chance in the city for experienced carpenters.

The Builders' Exchange, which was organized June 6, 1905, is in a flourishing condition and occupies commodious quarters in the Thiesen Building fitted with all modern conveniences. At the recent annual meeting the old officers were re-elected as follows: President, A. V. Clubbs; vice-president, C. H. Turner, and secretary-treasurer, F. M. Williams.

San Francisco, Cal.

Our correspondent, writing under date of June 7, says: During the month of May and the early part of June an immense amount of building was done in San Francisco, principally in the way of one-story frame structures, with also quite a large number of corrugated iron buildings. In the new business sections on Fillmore street and in the neighborhood of Van Ness avenue a good many two-story frame buildings, or large one-story buildings with galleries have been built, for stores that will probably stand for several years. A number of substantial frame factories are in course of construction in the heavy manufacturing district. The great majority of the thousands of temporary frame buildings will have to be removed within a reasonable length of time, but many of the corrugated iron structures will remain indefinitely in the districts where buildings of the highest class are not specified by the new building laws.

Both wholesale and retail prices were advanced $2 on fir lumber in San Francisco the last of May, making an advance of $4 on the retail price since the fire. Still it cannot be said that this increase was directly a result of the great fire, for the late advances in logs, the high freights and

the scarcity of labor would easily justify the prices. The lumber manufacturers of the Coast have had no disposition to take advantage of the reconstruction of San Francisco to advance prices unnecessarily. That is a contingency they wish to avoid, although they foresee that if the deliveries of lumber fall off seriously the reduction of stocks will force prices up when the stocks in local yards become low, provided the heavy building demand continues.

The situation has unfortunately developed friction among the lumber handlers to such an extent that all work on the water front ceased June 6. The United Shipping and Transportation Association threw down the gauntlet to the Sailors' Union, and through that body to the Water Front Federation, by ordering a lockout of all members of the Federation. What threatened to be a strike of sailors against steam schooner owners became a lockout on the part of all shipping associations. The big steamship companies have been directed not to receive freight of any kind and the stevedores were discharged. The consequences are too far-reaching to be foreshadowed. A recurrence of the troublesome time of 1901 is feared at the very time when every shipping facility of the city is needed to handle structural material for rebuilding.

The new building ordinance now awaiting adoption by the Supervisors, which was originally drafted by Engineer J. D. Galloway and others, gives reinforced concrete the same opportunity as the building laws in the large Eastern cities. But there has since been introduced the following amendment, which is regarded by many architects and engineers as inimical to that type of building: "Reinforced concrete walls shall be at least 6 inches thick. If the area of wall surface included between any two adjacent wall columns and adjacent floor girders exceeds 300 square feet and is less than 400 square feet the thickness of the wall shall not be less than 8 inches. If such area exceeds 400 square feet the wall thickness shall not be less than 12 inches." Some of this provision would make the cost prohibitive. M. C. Couchot, C. E., who prepared the sections on reinforced concrete in the proposed ordinance, said in commenting on the amendment: "There is absolutely no need for such restrictions. I can state that a 6-inch wall of reinforced concrete is a good deal stronger than a brick wall of 13 inches in thickness. We never build in reinforced concrete such structures as would have these wall dimensions as stated in the proposed amendment." "The property owners want no unjust restrictions now," said a leading citizen who has commenced the construction of three buildings and has planned to use reinforced concrete. "What is good law in the East for construction should be adopted here. At this time no such arbitrary obstacles should be placed in the way of rebuilding the city."

The construction of many new warehouses has been necessitated by the fire and a large proportion of these are of corrugated iron. Large wholesale companies and the railroads have both made considerable progress in these lines. The Southern Pacific will reconstruct its present freight warehouses, most of which escaped the flames. The destruction of almost the entire wholesale district has resulted in a general shifting of the heavy business center to the southward, toward the railroad terminals as a rule, but some of the new railroad warehouses will probably be built further northward, as the destruction of old buildings will facilitate their penetrating northward into the heavy business districts. The Southern Pacific Railroad will provide better facilities for handling freight in a modern manner with derricks, &c. On Kentucky street, just south of Channel street, a large warehouse has been nearly completed by the railroad company. This building is 800 feet long by 80 feet wide, and will be used to help relieve the present receiving quarters. It is equipped with all modern appliances, such as electric cranes for the rapid handling of large quantities of goods. This building is near the freight terminal at Fourth and King streets, which is one of the largest receiving yards for freight in the country.

In Oakland similar improvements are being made. Since the fire so many firms have gone to the city across the bay that the Southern Pacific at this point has been trying to do several times its normal business, which has so far made deliveries to consignees slow. The railroad people in order to tide over the emergency has had under rush construction a new freight shed similar in design to the one being provided in San Francisco. The shed in course of building will be 400 feet long and about 80 feet wide, with the necessary extra trackage. These tracks are laid so that the shed will be easy of access at either end. This building is being erected at Fifth and Kirkham streets, Oakland. There is talk of the erection of a large modern passenger depot in San Francisco by the Southern Pacific, on property purchased several years ago on Steuart street, which would be much nearer the Union Ferry Depot than the present little antiquated station at Third and Townsend streets.

According to the plans of the holders of lots in the business district, Kearny street will be built up with modern business structures, including a number of skyscrapers. F. A. Hihn will erect a 12-story "Class A" building at the corner of Bush and Kearny streets on the old site of the *Chronicle*. The building will have a steel frame with stone and reinforced concrete walls. The interior will be finished in metal, with the corridors of marble and tile. The cornices will be made of ornamental copper. In addition to its floors it will have a basement and subbasement. The building has been designed by Architect W. H. Weeks and will cost over $350,000. W. Friedman will erect a ten-story "Class A" building on the southwest cornor of Bush and Kearny streets, plans for the structure having already been accepted. The frame of the building will be of steel and the outer material stone and brick. The cost will be over $180,000. Chas. Pfaff is the architect.

Geo. D. Toy has announced that he will build an 11-story hotel on the corner of Powell and O'Farrell streets. The building will have a frontage of 68¾ feet on Powell and 43 feet on O'Farrell streets, with an extreme depth of 137½ feet. The Toy Hotel will be of "Class A" construction, will have metal doors, metal window casings and other fireproof devices. It will have 450 rooms and will cost about $500,000. The Fuller Construction Company of New York is figuring on contracts to complete the structure in ten months. The plans are by John Cotter Pelton.

Plans have also been prepared by G. A. Dodge and Glenn Allen for a six-story and basement structure, to be erected on the southeast corner of Bush street and Clara lane. The lot is 50 x 137.6 and is to be completely covered by the building. It is designed for a "Class A" construction of steel, brick and terra cotta. It is estimated that the structure will be completed about the end of January and it is calculated that its cost will be $170,000.

Springfield, Mass.

Local builders are having some trouble in securing a sufficient supply of building material for the work they have in hand, and the scarcity and high price of such material is likely to have its effect on the season's building record. Lumber is very high, though the dealers feel that the price has now reached the top and that they can supply the demand. There is a shortage in the supply of brick, which is giving most concern, and structural steel is likely to be seriously affected by the big Western demand. The mild weather during the past winter enabled the builders to continue their operations, so that no surplus bricks have been allowed to accumulate. New York firms have bid high for what bricks have been turned out in brickyards hereabouts and the bulk of them have gone to that city. Plumbers' supplies are also difficult to secure and the scarcity is impeding progress on a number of local buildings.

Springfield, Ohio.

More than 30 contractors, including carpenters, masons, electrical workers and others having to do with the contracting for buildings held a meeting on Friday, May 18, and organized a Builders' Exchange, with the following officers: President, C. A. Schuster; secretary, R. B. Gladfelter, and treasurer, W. M. Mitchell. The president is a member of the firm of Pete & Schuster, tin roofers. The secretary is one of the leading carpenter contractors of the city, and the treasurer is a member of the firm of Mitchell Brothers, plumbers and steam fitters.

One of the things which the organization expects to accomplish is the appointment of a building inspector. The architects of the city are said to be in thorough sympathy with the organization and the exchange starts out with bright prospects.

Washington, D. C.

The Master Builders' Association recently held its annual meeting and elected officers for the ensuing year as follows: President, James L. Marshall; vice-president, John McGregor; secretary, George C. Hough, and treasurer, Frank L. Wagner.

Notes.

The building permits which were issued in Wilkes-Barre, Pa., during the month of May indicate an active season in the way of building operations and the amount of work in progress is at present greater than any corresponding period in the history of the city.

The Master Builders' Association of Atlantic City, N. J., filed articles of incorporation at Trenton on May 21, the incorporators including Daniel Knauer, Charles D. Thompson and G. T. Goff. The objects of the organization are to promote the interests of master builders.

◆

What will probably be the largest and best equipped cold storage structure in this country is the 14-story building about to be erected on a site fronting on West, Reade, Washington and Duane streets, New York City. The stories above the first, containing some 2,000,000 feet of space, will be fitted with refrigerating devices, and, according to the architects, William B. Tubby & Brother, 81 Fulton street, the estimated cost will be in the neighborhood of $1,000,000. The organization will be known as the Reade-Duane Cold Storage Company. The building will have stores and basements suitable to the fruit and cold storage produce business.

HEATING AND VENTILATING A SCHOOLHOUSE.

SO little attention relatively is paid to the fuel consumption of heating systems that it is interesing to note the results in connection with a New England school building, the plans of which are here given. The heating system has been in operation for several years and the average coal consumption has ranged between 30 and 34 tons per season. Through the courtesy of a correspondent who has paid some attention to the fuel consumption in school buildings heated by different systems we are able to present some valuable data bearing on the subject.

The plan of the basement, Fig. 1, shows the location of the furnaces and their equipment. It will be noted that a large ventilating shaft 24 x 48 inches in size is built in connection with the chimney. One side of the ventilating shaft serves also as one side of the chimney, receiving the products of combustion from the two hot air furnaces and the stove located in the ventilating shaft. This warm chimney wall lends substantial assistance to the stove placed in the ventilating shaft to raise the temperature for the purpose of creating an exhaust current through the ventilating registers in the schoolrooms. A No. 281 New Hub hot air furnace, made by the Smith-Anthony Company, Boston, Mass., is relied on to furnish the warm air for heating and ventilating the two schoolrooms.

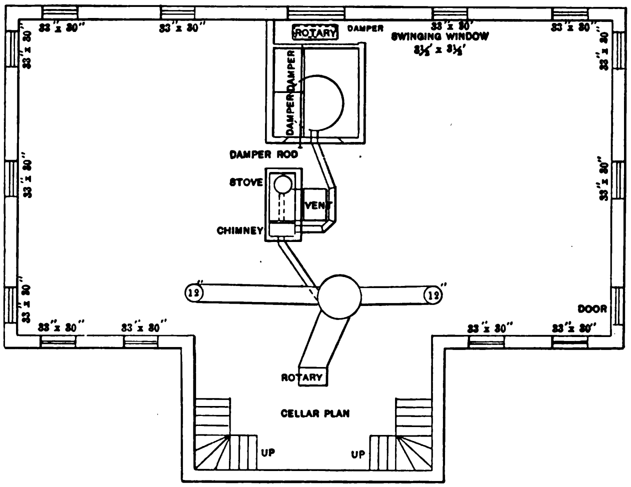


Fig. 1.—Plan of Basement.

Heating and Ventilating a Schoolhouse.

Provision is made to supply fresh air from out of doors to this furnace by means of a swinging window which is 3½ feet square. This window opens into a chamber which has a damper in the top connecting with the register in the floor of a passage way between the two schoolrooms, as shown in the plan of the first floor.

The air after passing through the furnace is discharged into two 24 x 24 inch warm air flues. Under the hall of the building a No. 201 New Hub furnace is located, receiving its air supply through a 34 x 18 inch return air register placed in the floor of the hall above and discharging hot air through two 12-inch pipes connected with two 12 x 15 inch registers. The plan of the first floor, Fig. 2, shows the location of this return air register in the hall. The return air register in the passage way between the two schoolrooms is 20 x 36 inches, and the plan shows also the two hot air flues, one discharging into each room by means of a 24 x 30 inch grill located about 8 feet above the floor, so that the incoming air will not cause uncomfortable draughts among the pupils.

A floor register and a side wall register of the same size connect with the vent flue as shown. Both the warm air flues and the vent flues are provided with dampers, so that the flow of air through them can be controlled as desired. In operation the window to the outdoor air supply is closed before the school assembles, the doors to the passage way between the two schoolrooms are opened and the return air register in the floor is opened. By this means the air in the building passes down to the large furnace and when heated is again discharged in the schoolroom, keeping up a circulation of the air, which facilitates a rapid heating. As soon as the school opens the air supply from out of doors is opened and the return air register in the passage way closed. The ventilating registers, which are closed when circulating the air in the schoolrooms, are opened as soon as the pupils are assembled. This is to insure an economical maintenance of the desired temperature within the school building during the night and of an ample supply of fresh air to meet the requirements of the Massachusetts law, which is 30 cubic feet of air per pupil per minute when the schoolroom is occupied.

The schoolrooms are designed for the accommodation of 31 pupils each. Their dimensions are 22½ x 27 feet, with a 12-foot ceiling, and their contents, with the amount of wall, glass and equivalent glass surface exposed, are given in the accompanying table. This also gives the area of the hot air flues and the vent flues, and the area of the fresh cold air supply. In computing the glass surface 4 square feet of wall surface has been considered equal in cooling effect to 1 of glass and 20 square feet of floor and ceiling space as equivalent to 1 of glass. It will be noted that the hall is not connected with the ventilating flue and that the air in it is circulated at all times. The renewal of the fresh air in this space is accomplished by the frequent opening of the outer doors by the pupils, the principal point being to maintain a comfortable temperature in the corridor to prevent a rush of cold air into the schoolrooms when the doors are open.

The hall contains 9168 cubic feet of space and the hot air pipes have an area of 226 square inches, which is a provision of 1 square inch of area in the hot air pipes to about 40 cubic feet of space and to 1.8 square feet of E. G. S. This is a larger proportion of air than is found in residence work, but it is not excessive, when it is considered that all of the air handled by this furnace is constantly in circulation, no outside supply being raised from a low temperature to the discharge temperature except that which enters when the doors are opened and through the crevices. The proportion in the schoolrooms is quite different, owing to the frequent changes of air required by the law for ventilation. The two schoolrooms contain 14,808 cubic feet of space, which bears a relation of 13 cubic feet of space to 1 square inch of area in

the hot air flue and the same relation to the ventilation flue. With the windows, walls, floors and ceiling, the equivalent glass surface is 572 square feet, which bears a relation of 0.5 square foot to 1 square inch of area in the hot air flue.

The furnace used for heating the schoolrooms has a 28-inch grate, and that under the halls has a 20-inch grate. They have a corrugated firepot made in sections and a large combustion chamber made of sheet metal, discharging the products of combustion into an annular sheet metal radiator. This construction presents a large expanse of heated surface and is designed to offer minimum obstruction or friction to the flow of air upward through the furnace, adapting it admirably for schoolhouse heating, where a large volume of air at a comparatively low temperature is essential. The 28-inch grate in the schoolroom furnace has an area of 615 square inches or 4.27 feet. The area of this grate has a relation of 1 square inch of area to 24 cubic feet of space and to 0.9 square foot of E. G. S. The 20-inch grate in the hall furnace has an area of 314 square inches or 2.2 square feet. The area bears a relation of 1 square inch to 29 cubic feet of space and to 1.3 square feet of E. G. S. The dimension of the grate in the stack heater is not given, but assuming it to be 12 inches in diameter, with an area of 113 square inches, the total grate area in the building is 7.23 square feet. On this 34 tons of coal are burned or 4.7 tons, or 9400 pounds of coal per square foot per season.

Assuming that the fire is run 180 days, this would give 52.2 pounds per square foot of grate per day. On the mild days of early fall and late spring it is fair to assume that less than one-half of this amount or about 1 pound per square foot per hour would be burned, but on the few extremely cold days as much as 7 pounds is probably burned per square foot per hour, particularly in the case of the large furnace. In fact, in severe weather it would not be difficult to burn 130 pounds of coal or more per day per square foot of grate surface in the large furnace, or a total of 610 pounds per day. Half of this amount would be burned in the eight hours the school is in session, or the equivalent of 8.1 per square foot per hour, or a total of 38.2 pounds per hour on a grate of 4.7 square feet of surface. The consumption of 38.2 pounds of coal in the type construction described at 8000 heat units per pound of coal gives a total of 305,000 heat units per hour. Assuming a temperature out of doors of 10 degrees below zero, the 576 square feet of equivalent glass surface would lose say 93.5 heat units per square foot of surface, or a total of 53,800 heat units per hour. To change the 14,808 cubic feet of air often enough to give each of the 62 pupils 30 cubic feet of air per minute, or 1800 cubic feet of air per hour, would necessitate the raising of 111,600 cubic feet of air per hour 150 degrees and would require roughly 245,500 heat units per hour, or a total of 209,300 heat units. How near these calculations would be borne out in actual practice unfortunately cannot be determined, as there are no records of the weight of the coal burned under the conditions mentioned, but they will give an idea to the student of the heating problem of what must be considered in such work. The student may assume different conditions and figure from a different point of view, but he will always have the fact for consideration that the plant in question has been in use for several years, giving satisfactory service, and that the coal consumption averages from 30 to 34 tons per season.

TABLE OF PROPORTIONS OF THE FURNACE HEATING SYSTEM.

	Space in cubic feet.	Wall surface. Square feet.	Glass surface. Square feet.	Equivalent glass surface. Square feet.	Hot air flue area.	Vent flue area.	Cold air supply area.
Schoolroom	7,404	588	99	221	576	576	1,764
Schoolroom	7,404	588	99	221	576	576	....
Hall	9,168	960	132	339	226	...	306
Floors and ceilings	...	...	...	206	...	...	....
Totals.....	23,976	2,136	330	987	1,378	1,152	....

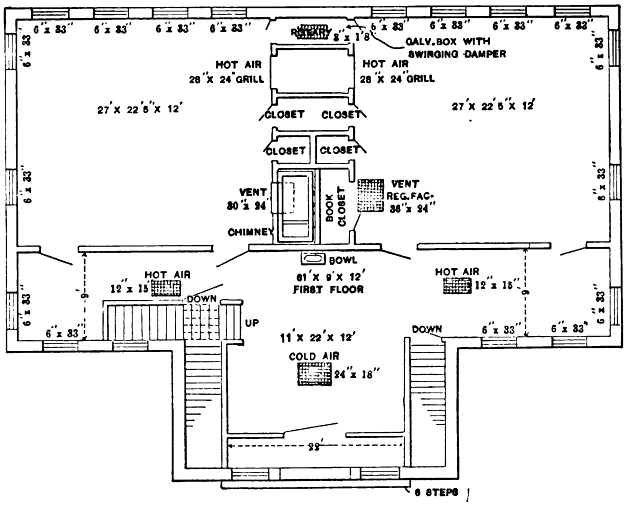


Fig. 2.—Plan of First Floor.

Heating and Ventilating a Schoolhouse.

◆◆◆

Moss Green Shingle Stain.

In reply to a correspondent of that journal who recently asked how to prepare in moss green a good creosote stain for dipping shingles and coating them after laying, *The Painters' Magazine* suggests the following: Make a liquid paint that is fairly stout, using pure white lead in oil, a strong chrome green in oil, raw umber in oil and a little lampblack until you have the desired shade, thinning with boiled linseed oil and a little japan. To a quart of this paint add for dipping purposes five quarts creosote oil, and for application with the brush mix one quart of the oil paint and three quarts of creosote oil. Some have recommended the use of part kerosene oil along with the creosote, but our experience is not favorable to its use. We also prefer the use of coal tar creosote to wood creosote.

◆◆◆

Tank chimneys or chimneys employed to support tanks which encircle the exterior at any hight desired are one of the relatively new developments of the age. The chimneys are carefully built to withstand wind pressures corresponding to a velocity of 100 miles per hour and care is taken in the choice of bricks. The details by which the tanks are supported by the brick work of the chimney are not at this writing available.

ENGLISH METHOD OF FITTING DOORS.

IT is always interesting to compare methods of doing work at home and abroad whatever may be the branch of trade to which it relates, and many of our readers are likely to find in the following article from a London building paper descriptive of English methods of fitting doors that which will attract their attention and possibly stimulate some of them to express their opinions.

When hanging a door we have to consider the following details. It must fit closely, but in such a manner as not to interfere with its free working at the top or at the bottom above the plinth. It must also be not too tight at the side where hinged. When considering these essential particulars it is necessary to bear in mind that the operation of polishing will make a slight difference, for which allowance should be made.

In the bottom of the door this will, of course, be absent. The top of the plinth will be polished; the top edge of the door will be polished if level or below the level of the eye, and the underneath edge of the top will be plain if lower, and polished if, as in a cornice, higher. You will see examples of these in bookcase and wardrobe doors. The carcase edges will, in most cases, be polished.

I shall have to allude frequently in my description and remarks to the measurement known as the thickness of a veneer, or half the thickness of a veneer, the term being used to express a distance that cannot be readily measured. Now veneers vary greatly in thickness, being cut from 16 to 160 to the inch; those most usually employed are 1-30 inch thick. If you halve 1-16 inch it will give you 1-32 inch, a distance nearly equivalent. You may, therefore, always consider the expression to represent this amount.

Before hinging a door it must be fitted. This requires doing very accurately, and it is indispensable that the work to which it is to be applied should be in a complete state. The top of the cabinet, or the cornice, if otherwise, must be fixed on in the position it is finally to be; and the plinth, if made with one and not supported on legs, should be screwed on.

Putting on the Butts.

The door is now carefully fitted widthways and taken to the requisite size. It is also fitted lengthways between the top and the plinth; in doing this you should take it to such a size that there will be the distance of the thickness of a veneer at the top, and 1-16 inch at the bottom. Having completed this we may proceed to put on the butts. First, consider the position in which they are to be placed. You will find the following distance one that can be pretty generally applied. Take the length of the door, and make one-eighth of this distance from top and bottom the position for the butts, letting this be the upper part of the top one and the lower of the bottom. Thus, in a door measuring 2 feet, it would be 3 inches from each end. Doors that are much larger than this generally require an additional butt placed equidistant between these two, while in those of a heavy nature four butts will not be too much. You must be guided by the nature of the work, and my previous remarks respecting the sizes you will require also by the thickness of the carcase ends. These are generally from ¾ inch to ⅞ inch thick, and the flaps of the butts should not be wider than three-fourths or four-fifths of this thickness.

The butts in all cases are first put on the doors. Set them to the previous markings, holding them square with the door, and on it as far as the width of the flap. Mark each end of it, this being best done with a knife. Now gauge on the door stile the width of the butt flap and half the knuckle, and gauge on the edge the thickness of the butt, adding sufficient for it to stand down the thickness of a veneer. Cut in the gauge and knife marks firmly; the end ones may be done with a saw, the other with a chisel. Now chop out the intervening wood carefully down to the mark, keeping it as level as possible. When this is completed try the butt and see if it fits; if necessary, make a slight alteration and retry; it must go completely in, but do so tightly. You may now screw it in, using screws having heads which will nearly fill the holes in butts. Do not use them too small, or the butts will, when in use, pull through the heads, but just sufficient for the heads to stand a trifle down.

The door is now held to the carcase edge, and the position of the remaining flap of the butt marked. To keep the door off the top the requisite distance I have already given, insert a piece of veneer between the top edge of door and the underneath of the top, pressing it closely up and keeping it in position with the door. You may replace the veneer, if more convenient, with a thickness or so of paper to correspond. The markings along the edge may be made with a knife; then cut in with a chisel, the end ones being cut as before with a saw. After cutting out the wood and fitting the butt you should close the door and see that it is right. When doing this it is not necessary to put in all the screws; it is, in fact, better not to do so, because if a slight alteration is required the screws will have to be removed. This is additional trouble, besides preventing their holding so well. By using one to each butt in the center or second hole you can make the preliminary trial and then make any slight alteration it may require. When correct put in the remainder of the screws. In the ends you will be able to use, if necessary, longer screws than in the door. Be particular how you bore for them. If soft wood, a small hole, allowing the screw to work its way in; if hard, a larger one. It may also be advisable to grease the screws in this case. The remarks I have made respecting the screws and butts in trying refer, of course, only to the work when in the position it will be whilst being hinged —viz., resting on carcase back.

Method When Centers Are Used.

I have explained when centers are employed. Before putting on, the door is fitted as before; the edge of the door should be rounded and the pilaster rebated sufficient for it to work in—about ¼ inch is usually sufficient for this. You will notice, if you look at a pair of centers, that one of them is made slightly different from the other, but in one which is intended for the bottom the pivot or pin is made with a shoulder above the plate to which it is riveted. This gives the requisite distance off the plinth for the door to work. The top or upper one is made close. The bottom center plate, with the pin affixed, is let into the underneath of the door, the rounded portion being near the back edge, and the edges of the plate equidistant from the inside and outside door edges. Mark its position, and take out the wood to a depth corresponding with its thickness, making the end where the pin-rivet is deep enough to receive it. Now knock it home and screw it; place the door in its position, press it downward on the plinth until the pin or pivot will leave an impression upon it. Then remove the door, bore a hole with a center bit large enough for the pin to work in. Set the remaining plate with the hole to correspond with this hole; mark it and cut as before, allowing it to stand a little down. Place the top plate on the upper edge of the door in the same manner; cut it in and then press it against the underneath of the top frieze, or whatever it works against. Having ascertained its position, let in the remaining plate as usual. In doing this it will be necessary to remove it before finally fixing.

There is nothing special to remark respecting stop butts with the back edge leveled forming the stop. In those in which it is formed by the spring underneath, you will require a good deal of room underneath for it to work. The flaps are cut in level with the work or slightly raised; then, when screwed, filed together, with the screw-heads level with it.

These, besides being applied to a fall shutting between cheeks at each side, are sometimes used for work

that shuts upon edges, as in a desk. The fall flap, or top, should first be fitted. The edge is now rebated out to receive the joint, the thickness of which has been previously marked upon it. It is now requisite to allow about 1-16 inch for the knuckle of the joint to turn in. After screwing proceed to mark the position of the flaps, taking care in so doing to keep the work equidistant from each end.

I will now take card table hinges or those used for similar purposes, describing those applied at the ends first. Take the flap and set the back of the expanded head level with the inside edge and its top level with the underneath of the table flap. Now mark it round with a knife or a striker and cut it to receive the plate, deepening the portion sufficient to take the head. The remainder should be taken out level and the plate allowed to stand a little down. When screwing use a larger one for the head. Place the flap upon the table, set the head level as before, mark its position, and cut it on in the same manner. Second variety with elliptical heads. These are placed on the top and face of the work, the ends alone showing endways. The position of the plate on the flap will be as follows: The inner edge, which is not level with the head, will require to be set in to that amount. This distance, which is about ¼ inch, cannot very well be marked with a gauge, as the plate tapers slightly. I prefer to take the whole width of the head. Mark its width, which is equal to the position of the back edge of the plate—this may be done with the gauge; then set this to it and mark the front from it. The necessary length and depth for the head where the tongue works must also be marked. This should also be done carefully, as the shape is rather difficult to get accurately and shows badly if otherwise. The remaining side is similar and fitted in exactly the same way. It is best to do this before screwing on the first, as one or two trials are sometimes required.

Table straps are applied in about the proportion I have given for butts. The back part of the rectangular enlargement is let in level with the inner edge of the flap, and the top plate with the table top. The position of the latter is more conveniently marked by reversing it and marking round, on account of the irregularity of the underneath. The side bracket shaped expansions are to be let in. You will notice that the riveted portion forming the knuckle describes in working a curve corresponding with these side brackets. The intervening wood should be cut out, care being taken to cut cleanly, and not leaving anything that will interfere with its working freely, whilst at the same time due attention must be paid to the position of the front hole for the screw, the hold of which must not be weakened. You should also be very particular to keep the plates perfectly level throughout.

◆

Building Law Regarding "Extra Work."

The Court of Appeals of New York State has just decided that a contractor who has constructed a building under an architect's plans and specifications, and whose contract provided that no allowance should be made for extra work unless an itemized estimate thereof was submitted by the contractor and the architect's order in writing had been given therefor, is precluded from recovering for extras claimed to have been performed on the architect's verbal orders. Nor does a provision in the contract that the architect, for the purposes of the contract, was acting as the agent of the owner authorize him to waive the requirements for an itemized estimate and an order in writing.

The case was entitled John Langley, respondent, *vs.* Peter W. Rouss, executor of Charles Broadway Rouss, deceased, appellant. The plaintiff entered into a contract with the defendant's testator in his lifetime by which the plaintiff agreed to perform certain mason and carpenter work in the erection, alteration and extension of certain buildings on Broadway, in the city of New York. The contract has been performed and the contract price fully paid. This action was brought to recover for certain alleged extra work consisting of:

1. Shoring, sheath piling, sustaining and underpinning, adjoining wall to 555 Broadway.	$3,414.40
2. Sustaining and shoring of beams and flooring of old building while columns and girders were being put in place	6,600.00
3. Temporary smoke pipe for boilers while chimney was being built	275.00
4. Shoring roof of old building where bulkhead has been erected; building temporary roof; removing tin roof; taking out fireplace arches; taking down brick wall; furnishing and putting in place new arches for two stories of bulkhead on the southeast corner of the old building	1,215.90
Total	$11,505.30

The defendant's testator by his answer denied the allegations of the complaint so far as it related to extra work and alleged that the labor and materials for which the plaintiff sought to recover in this action were and each of the same was included in and covered by said contract and that the plaintiff had been fully paid therefor.

The court held that the architect was expressly made the agent of the owner for the purposes of the contract, but such agency, so far as it related to making alterations or directing that extra work should be done, was limited, as in the contract stated, to such orders as he should give in writing. The restrictions on the authority of the architect were for the protection of the owner. Where contracts including plans and specifications involve a great amount of detail, and the merits of claims for alterations and extra work are difficult to determine and adjust after the work is completed, a provision requiring the contractor to submit itemized estimates of the expense of proposed alterations or extra work, and that the order of the architect therefor should be in writing, is reasonable and tends to a more definite understanding and avoids controversies. The contractor is not required to make changes or perform extra work unless he first receives written authority therefor, and the contract is therefore neither unreasonable nor severe and it should be enforced. An agent cannot enlarge his own powers by waiving the limitations thereon.

"Where the amount of work to be performed and materials to be furnished under and by a contract depend upon conditions that cannot be ascertained by inspection, and bidders are not required and given an opportunity to make such investigations as are necessary to satisfy themselves as to the amount of work to be done and materials to be furnished, and the contract, plans and specifications include representations as to existing conditions, which are inserted for the purpose of enabling contractors to determine what bid to make for the proposed work and materials, a recovery may be had as for a breach of contract for the damages caused if it shall turn out that the representations were erroneous."

◆

A Theater of Novel Design.

A THEATER and music hall of rather a novel design is at present being considered as an addition in the near future to the already extensive number of places of amusement in New York City. We understand that a site has been secured in Forty-second street, extending through to Forty-third street, just west of Sixth avenue, and the structure will be put up on lines similar to the music halls of Europe. The main entrance will be from Forty-second street, with an elaborate lobby extending through to the carriage entrance on Forty-third street. One of the novel features of the theater will be the seats, which will provide patrons arm chairs arranged in rows sufficiently far apart to admit of each seat holder taking his place without disturbing those already seated; commodious anterooms on each floor, a spacious restaurant, a magnificent dress promenade and an extensive roof garden. These are features which cannot fail to be appreciated.

New Publication.

Ventilation of Buildings. By William G. Snow and Thomas Nolan. Size, 3¾ x 6 inches; 83 pages. Published by D. Van Nostrand Company. Price, 50 cents.

The book is a continuous account, divided into three general parts, of what is involved in ventilation and of what are the features and limitations of different systems in vogue. It is designed chiefly as a primer for those who wish to be told simply and briefly what is considered best practice in ventilation, and certainly the scope of the book has been well fulfilled. The authenticity of the information can be no better vouched for than by an explanation of who the authors are. Mr. Snow, who is a member of the American Society of Mechanical Engineers and has had a varied experience in a wide range of heating and ventilating work, will be recalled as a frequent contributor to these columns and as the author of "Furnace Heating." Mr. Nolan is of the American Institute of Architects, and assistant professor of architecture in the University of Pennsylvania.

Of the useful information contained in this concise volume mention may be made of the description of simple tests for investigating the efficacy of a ventilating system by the presence of carbonic acid gas in the atmosphere, of the tables of the amount of air necessary in different kinds of buildings, and the considerations involved in connection with the space per capita in a given building and the period of occupancy, and of the considerations of plenum and exhaust systems of ventilation and upward and downward methods of air circulation. In a summary of methods of driving fans for ventilation it is stated that to develop each horse-power (for fan driving) would cost roughly, exclusive of attendance, 5 cents with gas, 3 cents with steam when the exhaust is not utilized, 10 cents with electricity and 40 cents with water (utilizing a water motor at ordinary city water rates), these figures being based on small machines, under ordinary working conditions.

Weights of Windows, Doors and Blinds,

It frequently happens that a contractor desires to know the weight of doors, blinds, sashes and other wrought stuff, in order that he may be able to provide for railroad expenses or other freight charges; and the following tables prepared by a writer in an exchange are presented as likely to meet such requirement:

Weight of Doors.

Size.	Thickness. 1 inch. Pounds.	1¼ inch. Pounds.	1½ inch. Pounds.
2 feet 0 inches by 6 feet 0 inches...	20	25	32
2 feet 6 inches by 6 feet 6 inches...	27	33	38
2 feet 6 inches by 6 feet 8 inches...	30	35	40
2 feet 10 inches by 6 feet 10 inches...	33	40	45
3 feet 0 inches by 7 feet 0 inches...	36	45	50

Weights of Windows.

Thickness, 1¼ inches.

Size of glass.	Glazed. Pounds.	Unglazed. Pounds.
7 x 9—12 light sheets................	13	6
8 x 10—12 light sheets................	15	6½
9 x 12—12 light sheets................	20	7½
9 x 13—12 light sheets................	21	8
10 x 12—12 light sheets................	22	8¼
10 x 14—12 light sheets................	23	8½
10 x 16—12 light sheets................	26	9

Weigh of Blinds.

Two Sheets to Each Window of 12 Lights.

	Pounds.	Feet.	Inch.		Feet.	Inch.	Pounds.
7 x 9..............	11	2	6	x	6	6	23
8 x 10..............	13	2	8	x	6	8	24
9 x 12..............	14	2	10	x	6	10	25
9 x 13..............	17	3	0	x	6	6	26
10 x 12..............	17	3	0	x	7	0	27
10 x 14..............	19	3	0	x	7	6	29
10 x 16..............	21	3	0	x	8	0	32
10 x 18..............	22	3	2	x	8	2	34
10 x 20..............	26	3	6	x	8	6	40

While the tables are not absolutely correct, as the weight of lumber varies, yet they are sufficiently near the truth to enable the estimator to obtain an idea as to the cost of freight when he knows the rate per 100 pounds. The table referring to glazed sashes will also give the estimator a fair idea of the cost of sash weights required for any given work. The following table may also be of service in estimating cost of freight on dressed and undressed lumber:

	Pounds.
Pine boards or plank, weight per M....................	2.700
Ceiling, dressed, ½ inch thick, weight per M............	1,900
Ceiling, dressed, ⅜ inch thick, weight per M............	800
Flooring, dressed, weight per M.......................	1,200
Ceiling, dressed, ⅝ inch thick, weight per M............	1,400
Ceiling, dressed, ¾ inch thick, weight per M............	1,600
Boards, surfaced one side, weight per M................	2,000
Dimension stuff, rough, weight per M...................	2,700
Shingles, per ¼ M. bunch............................	40
Pickets or other dressed stuff, per 100 feet.............	200

From these tables the weight of all the lumber and dressed stuff in a building may be determined, and the cost of freights to any given point obtained, railroad or steamboat charges per 100 pounds being known.

The Carpenter of To-Day.

The following is interesting as showing the light in which the carpenter is held by the trade in England, the comments being reprinted from a London building paper:

There is no mechanic in the building industry for whom the opportunities for advancement and chances for promotion are as numerous and at the same time as certain as in the "carpenter trade." This statement may be contradicted by many, and no doubt will be, but to understand it clearly we must delve below the surface.

The carpenter is the leading mechanic on the building; this is an acknowledged fact. He is usually the foreman of the job, and very often the superintendent of construction. He is required to know many things, particularly the peculiarities of the different trades engaged on the building. He must not only be a thorough mechanic in his own line of business, but he must know something of the "other trades," something of masonry, plumbing, roofing, plastering, &c. He it is who has to take the responsibility of carrying out everything in detail according to plans and specifications. It is seldom now that a building is erected without the assistance of an architect, but in cases where an architect is not required the carpenter is the first man to be consulted. He is looked upon as the builder and is required and expected to supply the details to all other trades. He lays out the ground, stakes the foundation, prepares and places in position the centers for the bricklayers and masons. In fact, he supplies whatever is necessary in the shape of mechanical skill for the completion of the building. If any innovation is introduced in the construction of a building for which there is no specific mechanic or contractor it usually falls to the lot of the carpenter to put it in operation. Whatever errors there may be in plans, whatever shortcomings in specifications, whatever mistakes the architect may make, the carpenter is called upon to overcome them and make them good. It will therefore be easily seen that a vast amount of responsibility rests on the shoulders of the carpenter, yet he is one of the most poorly paid mechanics on the building. It is a common thing for men to say that they would never allow a boy of theirs to learn carpentry or any of its branches, but it is an honorable trade of which no man should be ashamed; a good trade; one of the best. The greatest and best of men was a carpenter.

There are several stages to go through in the career of a carpenter. First as a shop boy, then as apprentice, then as a journeyman, afterwards as a foreman, and lastly, perhaps, as a superintendent of construction or a clerk of works. From this last position he steps into business for himself, either as a master carpenter, or builder, or building contractor. Sometimes he takes up drawing in all its branches and with his practical skill and experience as a carpenter enters a new field, very often with the chances in his favor of making a decided success. Many architects will be found who have driven the jack plane and found in the carpenter's trade their first advancement.

Taking it all in all, there are many chances of advancement for the carpenter if he is only made of the right stuff and quick to grasp opportunities. "There is a tide in the affairs of man which taken at the flood leads on to fortune." Remember such a time will come. Be ready for it.

Country Life in a Flat.

The particulars which follow relate to the apartments in the upper part of New York City of a bachelor who was fond of rural life, but whose business did not permit him to live out of the city, and who in order that his surroundings might harmonize with his notions arranged his quarters, which occupy an entire floor, after the manner here described:

His reception room is of unfinished timbers resembling hewed logs. The ceiling shows the rafters. The electric bulbs are inclosed in perforated tin resembling the old-fashioned tin lantern. Beyond is the tepee, utilized as a smoking room. It is separated from the sleeping apartment by cedar poles in the rough, constructed to resemble a rail fence. The tepee is arranged like a tent. A big iron kettle is suspended from a crane in the center. This is the ash receiver. The floor is covered with animal rugs. A collection of bows and arrows and tomahawks, horns, scalping knives and imitation scalps complete the scheme. In the room next fowling pieces, guns, rifles, pikes, fish nets and spurs are in evidence. A big, rough board holds flasks of various sizes, glasses, tumblers and cups. The flasks contain any brand which the thirsty visitor may desire. A coon skin is tacked over the bar and benches take the place of chairs.

A fence divides the "trough" from the next room, which is arranged to represent the back yard of a country home, with a dog kennel near the gate and a well box, with a sweep. On one corner stands the bucket, and a dipper and an old gourd hang on the box. The picture is realistic, but the windlass is never turned. Back of this is the end of a barn. The door is painted red. In an open square near by is the painted head of a horse, looking out as naturally as if it was about to whinny for its oats. A loose plank leads from the barn to the bathroom, which is concealed from view by what looks like a high board fence. Its equipments are about the only modern equipments on the entire floor.

◆◆◆

Instruction to Apprentices in a Baltimore Shop.

The different meetings of the National Association of Master Sheet Metal Workers have impressed W. A. Fingles, 1529 Maryland avenue, Baltimore, Md., that the only way to have good mechanics is to train apprentices. He has established in his shop a school of instruction which meets every Monday, Wednesday and Friday afternoon from 4.30 to 5.30. The school is under the supervision of his superintendent, P. W. Harriss, who gives the instruction. Mr. Harriss has willingly tendered his services and time to the apprentices of the shop for instructing them in the important work of pattern cutting, in the use of tools and how to lay down and form up different designs he explains to them. Mr. Fingles says that he would like to see his method of instructing apprentices more generally taken up, as he feels there is no doubt that a boy can learn more in half a dozen lessons of this kind than he would in a year at the business without instruction.

Beyond question the step taken by Mr. Fingles is worthy of commendation and of being widely followed by men in the same line of business, and we feel sure that many of our readers who would be willing to make an effort in this direction would be glad to have Mr. Fingles or Mr. Harris explain in detail their plan of procedure. It is our experience that worthy men are grateful for detailed instruction as to how to carry on a work for which other men have devised a successful plan. We will gladly accord whatever space may be necessary for some explanation of the system used in Mr. Fingles' shop and hope that we may have the privilege of presenting it.

◆◆◆

AMONG the many improvements now under way by which the section of Fifth avenue in the neighborhood of Thirty-fourth street, New York City, is being rapidly transformed into a business district is one at the corner of Thirty-fifth street, where the old New York Club House is being torn down to make way for an eleven story and basement office and store building, estimated to cost $300,000. It has been designed by Clinton & Russell, architects, with George A. Boehm as associate architect. The new building will have a frontage of 45 feet on Fifth avenue, and 111 feet on Thirty-fifth street. The facade will be of ornamental limestone. Another improvement about to be commenced is at the southwest corner of Forty-sixth street and Fifth avenue, where a brownstone dwelling is to be razed in order to make room for a ten story fire proof building. Still another is at the southwest corner of Forty-seventh street, on a plot 50½ x 100 feet, where an eleven story and basement business building is in process of construction. It will have a facade of limestone with columns of polished granite, and will be the first modern business structure so far north in the avenue. The architects are Maynicke & Franke, and the ground floor has been leased to Howard & Co.

THE United States Civil Service Commission announces an examination on July 5 and 6 to secure eligibles from which to make selections to fill a vacancy in the position of architectural draftsman in the Philippine service. Candidates will be examined in building materials and construction, freehand drawing and projections, architectural drawing and technical training and experience. There will also be an examination on the same date at places mentioned in a list, which can be secured from the Commission at Washington, D. C., for civil engineer and superintendent of construction.

CONTENTS.

Editorial—

Correspondence—

Novelties—

PAINTED TIN
GALVANIZED TIN

THIS IS THE AGE OF THE METAL SHINGLE.

Inflammable wood shingles, heavy slate, brittle tile and unsightly paper or tar have seen their day.

And the reason is that the NEW CENTURY METAL SHINGLE is the natural evolution of the shingle question.

They are fire-proof. They are light. They are unbreakable. They are artistic—and then beyond that are qualities of durability, strength, beauty and quick adjustment—all its own.

Note the appearance of just one building roofed with NEW CENTURY METAL SHINGLES and then compare it with the cheap, common kind done in wood, slate, paper or tar.

And then figure on this—that they're cheaper than wood, cheaper than anything when you figure all the saving points involved—insurance, protection, etc.

NEW CENTURY SHINGLES are handsome embossed design, the lock is simple, easy, perfect.

Don't fail to get the book, No. 25, we send you free, and post up on the roofing question, comparative costs, estimates, designs, etc. Address,

CHATTANOOGA ROOFING & FOUNDRY CO., Chattanooga, Tenn.

H AND C

THIS SASH OPERATING APPARATUS

is just the thing for stores, banks, assembly rooms, etc. There is no task too simple—none too complicated for us to meet.

We are convinced that it is the lightest running, easiest to install.

The right apparatus at the right price. Send for Catalog.

HITCHINGS AND COMPANY,
GREENHOUSE DESIGNERS AND BUILDERS,
Manufacturers of Heating and Ventilating Apparatus.
1170 Broadway, - - - NEW YORK.

H AND C

The New Book by F. E. Kidder

Strength of Beams, Floors and Roofs

is prepared especially for carpenters, draughtsmen and architects

WHO HAVE NOT HAD THE ADVANTAGE OF A TECHNICAL EDUCATION. : : :

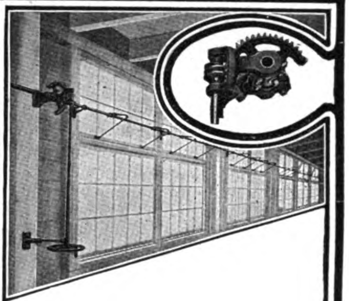
The rules given for the strength of beams and floors are very simple and practical, requiring for their application no higher knowledge than that of simple arithmetic.

The mechanical principles of the ordinary types of trusses are fully and clearly explained, and also the methods of computing the stresses and proportioning the members.

THE CHAPTER ON TRUSS JOINTS IS OF SPECIAL INTEREST : :

230 Pages TWO DOLLARS, PREPAID 164 Engravings

DAVID WILLIAMS COMPANY, Publishers
14-16 Park Place : : : · New York



In Operating Your Sashes

is it important that each sash shall be locked at a given point? Suppose you want both a good sash shifter and a self-locker, then you want our gear and our way of doing things with this gear.

First you want our catalog.
XV Edition.

Lord & Burnham Co.
1133 Broadway, Cor. 26th St.
NEW YORK

BOSTON BRANCH
819 Tremont Building

NOVELTIES.

The Edwards New Gothic Ceiling Plate.

Novelties.—Fig. 1.—Edwards New Gothic Ceiling Plate.

The term Gothic, at first applied simply as a mockery by the architects of the Renaissance period, is now accepted as the name of the style of architecture that flourished in Western Europe from the middle of the twelfth to the end of the fourteenth century. It varied under local influence in different countries, but its distinguishing characteristics were everywhere the same. In Yorkshire, England, however, there was a steady progressive development uninfluenced by any classic tradition, and therefore it reached a very marked character. English Gothic architecture may de divided into three distinct periods; namely, the early English from 1175 to 1272 A. D., the decorated from 1272 to 1377, and the perpendicular from 1377 to 1483; each period being about 100 years in extent, though the transition from one style to the next succeeding was so gradual that no exact dividing date can be set. The early English style includes the transition from the Romanesque to the Gothic. The decorated style is distinguished by wider arches, divided by narrow mullions, and the perpendicular becomes more and more complexed. We show in Fig. 1, a Gothic ceiling plate known as No. 1666, and one of the many handsome and artistic modelings being brought out by The Edwards Mfg. Company. "The Sheet Metal Folks," with offices and factory in their new location, 423 to 443 Eggleston avenue, Cincinnati, Ohio. The company advises us that they have in press now a new catalogue of metal ceiling and side wall designs of the different periods, and which they will be pleased to forward to parties interested.

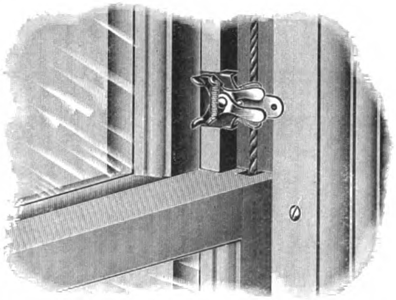


Fig. 2.—The Taylor Ventilating Window Fastener.

The Matchless Window Lock.

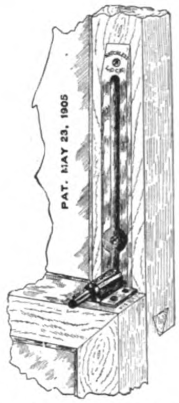
An automatic burglar proof window ventilating lock, which is known as the Matchless, and which embodies a number of interesting features, is being introduced to the attention of architects, builders and house owners by the Lawson Manufacturing Company, 40 Dearborn street, Chicago, Ill. The construction and operation of the device are so clearly indicated in the illustrations, Figs. 3 and 4, that comparatively little description would appear to be necessary. The locks are made in different metals and finishes, and are somewhat ornamental in appearance. In putting on the locks it is first necessary to engage the head of the spring bolt into the slide and then fasten the latter with flat head screws to the upper sash, the beveled end up. The bottom of the slide rests snug to the bottom of the upper sash. The lock is fastened on top of the lower sash or meeting rail with round head screws. For sash such as indicated in Fig. 4, locks with long bolts are used.

The Taylor Ventilating Window Fastener.

The ventilating window fastener shown in Fig. 2 snaps into place when desired and can be put on or taken off instantly. It is alluded to as not marring the window unless an attempt is made to open the window wider than the point at which it is set. If an attempt is made from the outside to get in the locking levers will move about ¼ inch, locking themselves both to the window and to the parting stop and then positively locking against the lugs on the fastener so that the window cannot be opened any further. The fastener locks both the upper and lower sash; both can be locked open or shut, or one open and one shut, as preferred. The fastener can be changed from one window to another, and it is impossible, it is explained, for children to open a window protected by the fastener far enough to fall out. The device is designed for ventilating rooms both at night and during the day, and can easily be carried in the pocket for use when traveling. It is put on the market by the Taylor Mfg. Company, Hartford, Conn.

The Pauly System of Concrete Construction.

A 20-page pamphlet containing some very interesting information regarding the Pauly system of concrete construction has just been issued by the Concrete Stone & Sand Company, Youngstown, Ohio. In this connection special reference is made to Pauly's concrete wall machine, and to the Pauly concrete veneering block machine. In regard to the latter the statement is made that the veneering blocks are 1 to 1½ inches thick, each having a 4 inch bearing surface, while the outside surface or wall measurements vary to every possible multiple of 12 x 24 inches. The fractional sizes are so arranged as to space out in the operation of laying to finish any length of course terminating with an even inch. The company also states that the veneering blocks can be used in any set of drawings prepared by a reliable architect for constructing outer walls and are especially recommended for every kind of curtain wall where structural steel, reinforced concrete or wooden construction is used in the skeleton of the building. The illustrations are half-tone reproductions from photographs showing the wall machines in actual operation and also the appearance of one collapsed ready for transportation. A folder accompanying the pamphlet gives instructions for setting up and operating the concrete wall machine, and also the proportions of the concrete mixture which the company has found to be highly satisfactory in its work. Reference is also made to the method of seasoning the blocks and to other points likely to prove of interest to the contracting builder making use of this form of construction.



Matchless Window Lock.—Fig. 3.—Broken View of Sash, Showing Lock and Slide in Position.

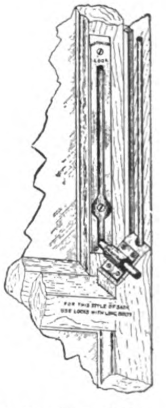


Fig. 4.—Construction, Calling for Use of Locks with Long Bolts.

Banquet for Employees of E. C. Atkins & Co.

Three months ago the men who had been employed at the Atkins Saw Works for 20 years or more organized the "Atkins Pioneers," and on the evening of Saturday, May 26, they were tendered a banquet at the Grand Hotel, Indianapolis, Ind., by E. C. At-

kins & Co. Twenty years ago the pay roll of the company showed 75 men and at this banquet 62 of those men were present. After the *menu* had been properly considered President John H. Wilde of the "Pioneers" as toastmaster introduced various speakers, who responded to the toasts which had been assigned them. Most of the responses were humorous and at the same time replete with satirical hints of interest solely to the men about the board. While there are only 62 men out of the 1100 at present on the pay roll of the company who have been 20 years or more with the concern, there are many who have been employed from 10 to 19 years.

Novelties.—Fig. 5.—Ford's Brace Screw Driver.

In one of the local papers appeared a history of the life of "Old Bill Miller," the most venerable employee of the company, and a man of 70 years. He has been with the Atkins Company for 41 years, and began holding cicular saws, as he puts it, in 1864.

Ford's Brace Screw Driver.

There has just been placed upon the market a new brace screw driver which embodies features of merit likely to command the attention of the trade, and which we understand from the manufacturer is meeting with a ready sale. In selecting the steel for the tool the maker tried a number of high grade crucible steels and selected for use the kind that gave the best results. The statement is made that thoroughness and care characterize each operation in manufacturing this brace screw driver, which by the way is known as the "Ford," and the result is a tool referred to as "perfect in workmanship and finish." The tempering, which is of paramount importance, is done by a special process, the claim being made that the tools will neither bend nor break. The screw driver shown in Fig. 5 of the engravings is turned out by the Ford Auger Bit Company, Holyoke, Mass., and every tool bearing its name, is guaranteed. The screw driver in question is made in 4 inch and 6 inch lengths, and with points 1/4 inch, 5-16 inch, 3/8 inch, 1/2 inch and 5/8 inch wide.

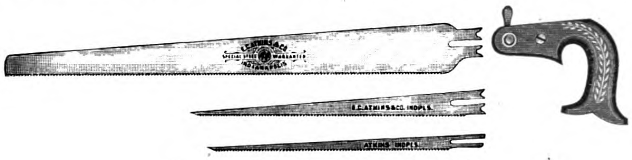


Fig. 6.—Atkins New Metal Cutting Saw.

Atkins New Metal Cutting Saw.

There is probably not a carpenter or builder in the country who is not occasionally confronted with the necessity of cutting through a nail or piece of metal of some kind, and yet who lacks conveniently at hand a suitable tool for the purpose. In order to meet what appears to be a well defined demand in this direction E. C. Atkins & Co., Indianapolis, Ind., have put out a metal cutting saw for carpenters, gas fitters, furnacemen and all others likely to find such a tool useful. It is in the shape of a nest of saws, and is illustrated in Fig. 6 of the engravings. The large blade is for cutting nails and is made of "Silver Steel" especially hardened for metal cutting purposes. The teeth are cut straight across and the saw operates without a set. It is taper ground from tooth edge to back and is of sufficiently wide gauge so as to cut a kerf wide enough to permit the use of a properly set ordinary saw without damage to its teeth. With the nail cutting blade is furnished both a compass and a keyhole blade, also made of "Silver Steel," and gas tempered to that particular degree essential to produce the best results and hold their keen cutting edges the longest possible time. Any of the blades are made to fit an adjustable handle, which is operated by a thumb lever. The blades can thus be used in the regular way or made to operate at any angle, or even reversed if so desired. By the use of this tool it is obvious that the operator can reach almost any speed desired, and after starting the kerf with either of the small blades he may insert the metal cutting blade, which is made narrow on the point with that end in view. The nail can then be cut, after which the metal cutting blade is withdrawn and an ordinary blade substituted. The nest of saws (known as No. 3), can be secured through the home office at Indianapolis or at any of the ten branches, whch are located in Atlanta, Memphis, Chicago, Minneapolis, New Orleans, New York City, Portland, Seattle, San Francisco and Toronto, Canada.

Catalogue of Wood Mantels.

Architects and builders are likely to be interested in a catalogue of artistic wood mantels which has been issued by the George W. Clark Company, with offices at 91 Dearborn street, Chicago, Ill., and 306 Main street, Jacksonville, Fla. The illustrations of the mantels are such as to indicate the grain of the wood and style of finish of the various designs, and in connection with the pictures are brief descriptive particulars, together with the numbers by which the mantels are ordered. The statement is made that all mantels shown in the catalogue are shipped direct from the factory at Knoxville, Tenn. Accompanying the publication is a leaflet carrying illustrations of a number of designs in grills and grill arches suitable for interior use in private dwellings and in connection with any opening where decorative effects are desired.

The Stewart Cement Block Machine.

Among the many machines at present on the market for turning out hollow building blocks may be mentioned the "Stewart," which is made by the Stewart Cement Block Machine Company, Lafayette Building, Waterloo, Iowa, and for which strong claims are put forth. Hollow block construction in connection with building operations is no longer an experiment, but is largely a question of the best means for accomplishing satisfactory results. The use of hollow blocks in the construction of the walls of a building, it is claimed, renders it cooler in summer and warmer in winter, while at the same time it is economical, as it requires less material than a solid wall. One of the important features of the Stewart machine, which is shown open in Fig. 7 of the illustrations, is that it locks itself and this is accomplished with one movement of the lever. The machine is provided with a table which opens and closes with the side and end plates. When the machine is closed the table makes it a very handy and convenient machine to fill with concrete. The machine has a capacity for making blocks 24 inches long, 8 inches high and 8, 10 and 12 inches in width. It will also turn out corner blocks as well as fractional blocks, 4, 8, 12 and 16 inches in length for each and every size, also angle blocks of any desired angle. Blocks can also be made from 1 to 8 inches in hight, according to requirements. With each machine is furnished two rock face designs, one pick face and one plain face. The weight of the machine complete is said to be about 450 pounds.

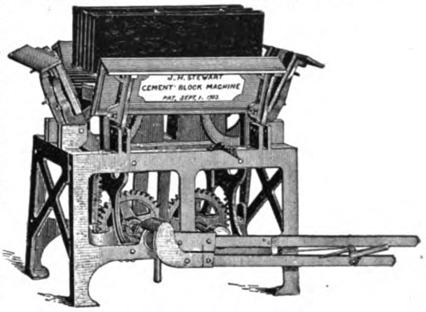


Fig. 7.—The Stewart Cement Block Machine.

The company has issued an attractive catalogue illustrating and describing this machine and showing some of the buildings which have been constructed with blocks turned out by it. Not the least interesting feature are tables showing sizes and designs of blocks made on the Stewart machine, also figures comparing the cost of wood, brick and stone construction with cement blocks, the results being in favor of the latter. A number of testimonial letters are given showing the estimation in which the block machine is held by some of those who have practically demonstrated its merits.

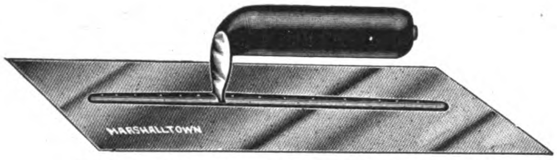
Preparation of Slate Illustrated.

The preparation of slate, from the quarries to the storage yard, where it is ready for shipment, is illustrated by a series of admirable half-tone engravings in a catalogue which may be had from the Genuine Bangor Slate Company, manufacturer of roofing slate, Easton, Pa. The actual operations of quarrying are explained, but the most interesting parts of the publication are those describing how the slate is divided into blocks and then split into pieces of suitable size and thickness for roofing purposes. Some valuable information is also given on the different uses to which slate is put, including treads, risers and platforms in staircases, mantels, washtubs, sinks, and, of course, slate blackboard and roofing slate. An interesting argument on the vital im-

portance of a good roof with reference to slate, and facts concerning slate roofing as to sizes, weights, specifications for, directions for measurement and how it is laid, lend practical interest to the publication.

Marshalltown Finishing Trowel.

The finishing trowel illustrated in Fig. 8 is made by the Marshalltown Trowel Company, Marshalltown, Iowa, and has a 22-gauge blade, although 24 gauge can be furnished if desired. Nickel steel of the best grade is used in the manufacture of this tool, the mounting extending within 1 inch of each end of the blade, leaving plenty of spring for finishing. Ten rivets fasten the blade to the mounting, which effectually prevents the lime from working in between them. The company also offers a browing trowel in which 12 rivets are used, the mounting extending within ¼ inch of each end of the blade.



Novelties.—Fig. 8.—Marshalltown Finishing Trowel.

Bogenberger Metal Window Frames.

It is only necessary to point out that statistics show that one-third of the fire losses in the country is chargeable to what is known as the exposure hazard—that is, fire communicated from one building into another through windows or roofs—to indicate the importance of fire resisting construction in the exterior of buildings. Experts know that wire glazed hollow metal window frames afford an effective and reliable fire stop, and this fact should lend interest to the catalogue issued by F. Bogenberger & Brother, 267 Sixth street, Milwaukee, Wis., devoted to fireproof windows. The catalogue shows some notable buildings which have been equipped by the firm and a number of pages illustrate different types of windows, some of which are arranged to raise and lower and others of which have a pivot at the top for automatic closing when left open at night and a fire in an adjoining building subjects the window to heat. Detail drawings explain the construction. It is pointed out that the construction is such that either the window or the weights may be removed from the frame with little trouble in a few minutes. The windows are also adapted for use on skylights and lantern roofs. The wearing parts are made of heavy brass, so that they do not need any paint and there is nothing to rust or get out of order. These windows are glazed with wire glass, which may crack under the fire, but on account of the wire will not fall out and scatter and allow the flames free passage. The firm also makes skylights, cornices, finials and similar sheet metal work and invites correspondence from the trade.

The Batdorff Eave Trough Hanger.

An eave trough hanger that can be applied without tools has recently been brought out by the Canton Cornice & Skylight Company, 414 East Seventh street, Canton, Ohio. In the accompanying illustration, Fig. 9, is a view showing the construction of the hanger and the way it is applied. The hanger band or strip of metal which passes around underneath the trough and the cross bar above it, which is a continuation of the hanger band, is made of No. 22 gauge galvanized iron 1 inch wide. The ends are formed as indicated in the view, so that one end is passed through a slot in the other and the fastening made by bending over the tongue with the hand. A feature of this hanger is the strengthening of the cross bar. About 3-16 inch long, each edge of the cross bar is turned down, leaving a top surface ⅝-inch wide, making the cross bar serve as a brace. The part of the band supporting the trough is, of course, 1 inch wide. The suspension rod is made of No. 16 galvanized iron ⅝ inch wide, and is riveted to the cross bar with a 4-pound galvanized rivet. The chief point of the hanger, which is known as the Batdorff Reliable hanger, is that it can be applied without tools and can be adjusted to any fall or pitch.

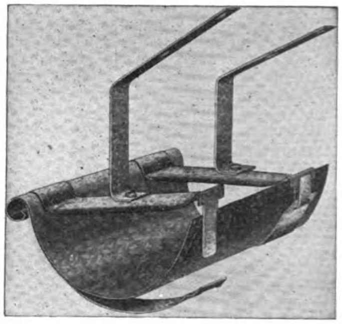


Fig. 9.—Batdorff Eave Trough Hanger.

Variety Wood Worker.

A new machine embodying a number of features of interest to contractors, builders and operators of planing mills, pattern and specialty shops, is the variety wood worker, which has just been placed upon the market by the Cordesman-Rechtin Company, Cincinnati, Ohio. The machine is constructed wholly of iron and steel, and is referred to as possessing great strength and lasting qualities. The table is cast in one piece, but is grooved for the reception of the sliding tongue attached to the rip and cross cut gauges. It also has deep recesses to receive the adjustable table plates, which slide horizontally to open or close the gap for the cutter heads and saws. The rear or receiving plate has also a vertical movement to compensate for the cut taken as on a regular hand planer or jointer. The sliding and supplemental plates are milled on all four sides and fit perfectly true. The mandrel is of large diameter steel, revolving in self-oiling bearings and driven by a 4 x 5½ inch pulley. The mandrel carries the jointer heads and saws, but not the boring bits, and may be adjusted without disturbing the position of the independent boring mandrel. This boring attachment with its independent mandrel and tight and loose pulleys is securely mounted on an independent bracket, fitted to planed surfaces on the side of the machine opposite that to which the sawing or planing is done. The claim is made that by this arrangement two operators can work on the machine at once without interfering with each other. The boring table adjusts vertically by crank handle and screw and also slides to and from the boring bit. The routing attachment consists of a hardwood table provided with eccentric clamp and a metal tongue. In operation the router table is given an oscillating movement by the operator's hands and with the work clamped upon it is fed up gradually to the router bit already inserted in the boring mandrel. There is also a tenon attachment and panel attachment and a self feed rip saw attachment, all of which can be used in connection with the machine. The main table measures 3 x 5 feet and the floor space required is 3 x 6½ feet. The boring attachment extends 2½ feet to the side of the machine, as does also the countershaft. A general idea of the construction and arrangement of the machine may be gathered from an inspection of Fig. 10 of the engravings.

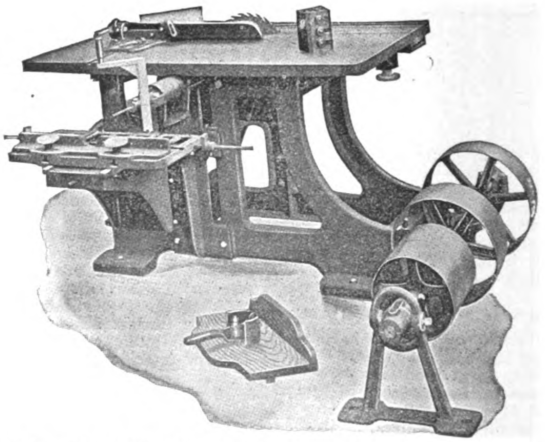
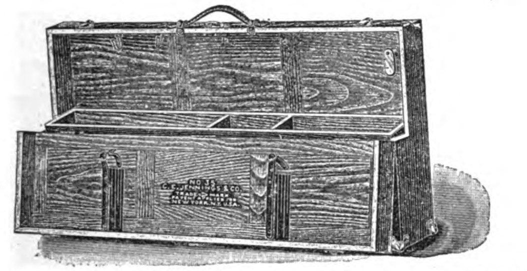


Fig. 10.—Variety Wood Worker Made by Cordesman-Rechtin Company.

Carpenters' Hand Tool Cases.

C. E. Jennings & Co., 42 Murray street, New York City, has just put

on the market two entirely new types of tool cases for carpenters and electricians, as illustrated in Figs. 11 and 12, and for which patents have been applied. They are not only convenient for carrying about like a dress suit case, which they resemble, but are fine in appearance. Fig. 11 shows the Carpenters' Hand Tool Case No. 35, as it appears open. The material is selected hard wood with paneled sides. The case is fitted with a brass lock, leather handle with rings for strap to pass over the shoulder, metal clasp and corners, saw rack for holding four saws to 28-inch, inclusive, including rip saw, hooks for brace and coping saw, wood button for try square and partitioned tray for bits, chisels and small tools. There is space in bottom to hold planes, levels, &c., and a steel square, full size, with 18-inch tongue, can be carried. The outside dimensions are length 34¼ inches, hight 17 inches and width 6 inches. The inner dimensions are length 33 inches, hight 15¾ inches and width 5 inches. The removable tray is 32½ inches long, 1¾ inches high and 4¼ inches wide. The case weighs empty about 15 pounds and for shipment is crated in sixes weighing about 100 pounds. The case shown in Fig. 12 is built on the same general lines.



Novelties.—Carpenters' Dress Suit Tool Case. — Fig. 11.—View Showing Interior Arrangement and Fittings.

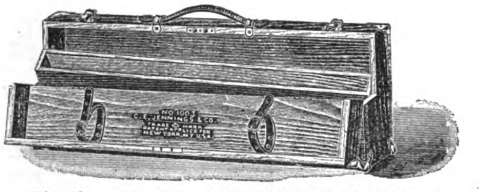


Fig. 12.—Open View of Electricians' Hand Tool Case.

TRADE NOTES.

KNISELY BROTHERS, manufacturers of metal covered sash and doors and other sheet metal specialties, Fifth avenue and Twenty-eighth place, Chicago, have suffered the loss by death of important members of the firm during the past few months. On November 14 of last year Richard W. Knisely died at Colorado Springs, Col., and on April 12 John A. Knisely died at Chicago. A circular letter from Charles T. Knisely informs the trade that the business will be continued under the name of Knisely Brothers, as in the past.

CHICAGO METAL COVERING COMPANY, 69 to 71 North Green street, Chicago, Ill., calls attention in its advertising space this month to the fact that it is prepared to furnish metal covered wood moldings of every description, made in German silver, brass, copper, gold, bronze, steel and oxidized copper. A copy of "Catalogue No. 8," which the company has issued, can be secured on application by any one interested.

THE BLOTTING PADS carrying a calendar for the month of June which are being distributed among their friends in the trade by the Joseph Dixon Crucible Company, Jersey City, N. J., are embellished with a picture representing a couple of young fishermen who are using a Dixon American graphite pencil for a fishing rod. One of the anglers has just drawn out a fine looking specimen which he is holding up on the end of his line, while the other has made a "cast" and is anxiously awaiting a nibble.

F. DIECKMAN, 1182 Harrison avenue, Cincinnati, Ohio, calls the attention of architects, builders and others interested to the fact that he manufactures 1225 varieties of conductor elbows and is therefore in a position to meet many requirements. Illustrations of two styles of elbows are shown in his advertising card, which appears in another part of this issue.

A BOOKLET illustrating and describing the Edwards metal shingle, roof crestings, metal fireproof windows, &c., has just been issued from the press by the Edwards Mfg. Company, "the sheet metal folks," Cincinnati, Ohio. The booklet is of a size to conveniently carry in the pocket, and the illustrations clearly show the goods in question as well as the application of various forms of metal shingles. In connection with the text are dimensions and prices, and the matter is arranged in a way to be of interest and value to the architect and builder.

"STRAWS WHICH SHOW WHICH WAY THE WIND BLOWS," a monthly statement issued by the Ideal Concrete Machinery Company, South Bend, Ind., shows for May 322 shipments of machines scattered throughout 26 different States in the United States, two to Cuba, one to Buenos Ayres, Argentine Republic, S. A., and another to Atsuta, Owari, Japan.

THE AMERICAN ASBESTOS & FIREPROOFING COMPANY has been incorporated under the laws of the State of Virginia with a capitalization of $16,500,000, with main offices in the Broad-Exchange Building, New York City. The company is a merger of the American Asbestos Company of New York and the Mark W. Marsden fireproof building material interests of Philadelphia. The officers are: Webster Blocker, president; A. M. Higgins of Terre Haute, Ind., vice-president, and Mark W. Marsden, general manager.

THE BOYNTON FURNACE COMPANY, 207 and 209 Water street, New York City, is sending out an attractively printed catalogue of 48 pages, illustrating and describing the Boynton hot water heaters and low pressure steam boilers for heating buildings. The various lines are described somewhat in detail, and in connection with the text are tables showing the sizes made, the dimensions of the grate, the hight of the water line, diameter of the boiler, size of smoke pipe and the amount of radiation. The styles and sizes which are manufactured are sufficient to meet varying requirements, and architects and builders generally will find the catalogue an important addition to their collection of trade literature. The company issues a separate catalogue illustrating and describing its line of heating furnaces, also a catalogue of its ranges.

THE IMPROVED BUILDERS' LEVEL made by the Bostrom-Brady Mfg. Company, Atlanta, Ga., and which was illustrated in the Novelties Department a few months ago, is meeting with increased popularity wherever its merits are made known, and the company is in receipt of orders from widely scattered sections of this and other countries. Recent shipments were made to Mexico, Canada, San Diego, Cal., and Savannah, Ga., clearly demonstrating the universal adaptability of the level for work in all sections of the country.

HITCHINGS & CO., greenhouse designers and builders, 1170 Broadway, New York City, calls attention in its advertising space this month to a sash operating apparatus which is especially adapted for use in stores, banks, assembly rooms, &c. There are no complicated parts to get out of order, and the apparatus is referred to as light running and easy to install. The company also manufactures heating and ventilating apparatus, and architects and builders interested can secure a copy of the company's catalogue by making application to the address above.

A PLANER, matcher and molder embodying a number of interesting features of construction and which is said to be the latest addition to its already extensive assortment, is illustrated and described in its advertising space this month by the Cordesman-Rechtin Company, Department B, Cincinnati, Ohio. A special feed mechanism made of steel frictionless roller link chain is claimed to insure durability and simplicity, while at the same time eliminating many gears and studs. The machine has a capacity for planing up to 26 inches wide and 8 inches thick, and matches up to 14 inches wide and 2 inches thick. The manufacturer claims that it requires little room and power and that it will be found convenient in many respects.

"REDUCED RATES FOR TELEPHONE SERVICE" is the striking announcement presented in another part of this issue by the New York Telephone Company, New York City. These reduced rates throughout Greater New York are effective from July 1, and the statement is made that contracts are now being taken at the new rates. Full information can be obtained from any of the company's contract offices, located at 15 Dey street, 115 West Thirty-eighth street, 220 West 124th street, and 616 East 150th street.

HOUSE HINTS PUBLISHING COMPANY, Department 34, Philadelphia, Pa., has issued a booklet which will be found to contain interesting information for those who build, buy or rent a home. A copy of the little work can be had on application to the address given.

Carpentry and Building
WITH WHICH IS INCORPORATED
The Builders' Exchange

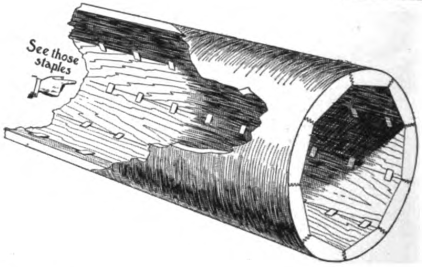
PUBLISHED MONTHLY
To all parts United States, British America and Mexico, - $1.00 Per Year
To all other Countries, - - - - - - - - 1.25 Per Year
Advertising Rates on Application.

BUSINESS OFFICES.
NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHERS........14-16 Park Place.
PHILADELPHIA—S. S. RECKEFUS, Manager..Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—WALTER C. ENGLISH, Manager........Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, Manager........Park Building, 357 Fifth Avenue.
CHICAGO—A. A. AINSWORTH, Manager........Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—HENRY SMITH, Manager........Pickering Building, Fifth and Main Streets.
CLEVELAND—EZRA S. ADAMS, Manager........The Cuyahoga, 311 Superior Street.
ENTERED AT THE POST OFFICE, NEW YORK, AS SECOND-CLASS MATTER.

THE ONLY PERFECT AND RELIABLE LOCK JOINT COLUMN MADE

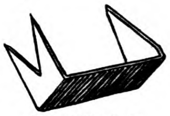
WRITE TO-DAY

PATENTS
PENDING



Columns are glued up under enormous pressure and then the staples are driven in as shown in illustration by our special machinery.

FREE OFFER On Receipt of Postal saying where you saw this Adv. we will send you postage paid a Sample Section of this Column showing the wonderful Lock Joint.



Cut of Staple is three quarter size.

THEY CANNOT OPEN AT THE JOINTS

Put them where you will, in the hottest room, the driest or dampest climate, they POSITIVELY WILL NOT OPEN. WE GUARANTEE IT.

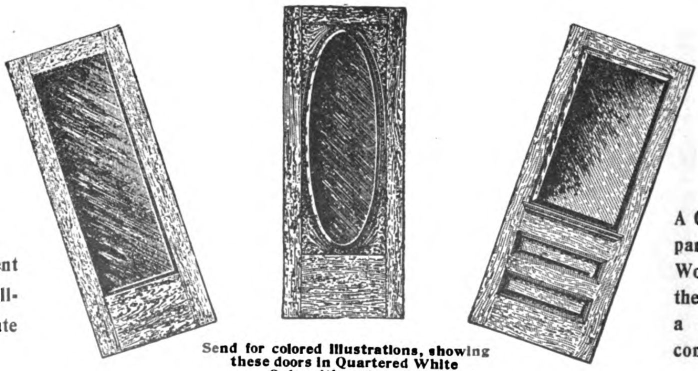
Made only by

AMERICAN COLUMN COMPANY, BATTLE CREEK, MICH.

DON'T TAKE SUBSTITUTES.

Our Line Of

Hardwood Veneered Front Doors



Send for colored illustrations, showing these doors in Quartered White Oak with net prices

A large assortment of all kinds of Millwork for immediate delivery

A Guarantee accompanies every order. Workmanship is of the highest grade, as a trial order will convince

Carpenters and Builders

This is a picture of Our 200 Page Catalogue, just off the press, and ready to mail upon request, WITHOUT CHARGE

**6 x 9 Inches.
Over 700 Illustrations.**

Schaller-Hoerr Company

416-426 Blue Island Ave., Chicago, Ill.

GET IN TOUCH WITH "THE MANTEL FOLKS"

IF	GOOD DESIGNS
YOU	RIGHT PRICES
	PROMPT SHIPMENTS
WANT	PERFECT SATISFACTION

If you have never done business with us, we want you to write us TO-DAY concerning present or future mantel needs and we shall be pleased to send you our catalogue with best prices, FREIGHT PREPAID TO YOUR STATION. Send us a trial order and see what our goods are like. YOU'LL NOT BE DISAPPOINTED.

If we can save you money,
You want to know it, don't you?

The A. W. Burritt Co., **400 Knowlton St.,**
"The Mantel Folks," **Bridgeport, Conn.**

LORENZEN MANTELS

AND GRILLES

Also contractors for Ceramic Mosaic and Tiles, Interior and Decorative Marbles, also manufacturers of Improved Scagliola for Bathrooms, Vestibules and Interior of Lobbies and Corridors in Banks, Libraries, Hotels and Public Buildings.

To Carpenters and Builders. FREE.

We will mail our large, handsome 96 Page (10 x 12) Catalogue, the largest Mantel and Grille book ever published, which costs us nearly 50 cents. Send us your business card and we will show you a way to make money by becoming our sales agent for your territory.

Write To-day.

CHAS. F. LORENZEN & CO., Inc.
253 North Ashland Ave., Chicago.

We have just shipped a carload of our Mantels and Interior Finish to the United States Legation Buildings, Pekin, China.

LORENZEN PAYS THE FREIGHT

OUR descriptive catalogue of Building Trades Books will interest every progressive Carpenter and Builder.

DAVID WILLIAMS CO.,
14-16 Park Place N. Y.

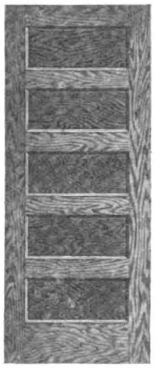
HOW TO MIX PAINTS

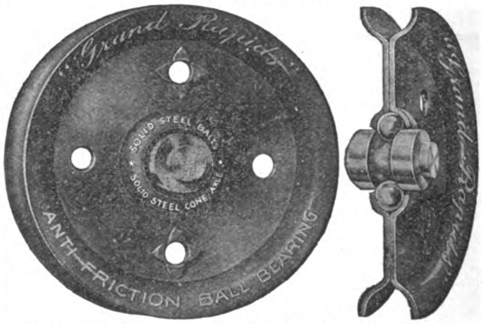
¶ A simple treatise suited to the requirements of carpenters, builders and others, who have not had the benefit of long training and experience in the mixing of colors. It will assist the reader to match any given color. **Fifty Cents, Postpaid**

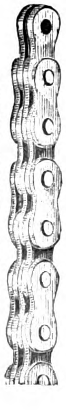
David Williams Company
14-16 Park Place - - NEW YORK


623

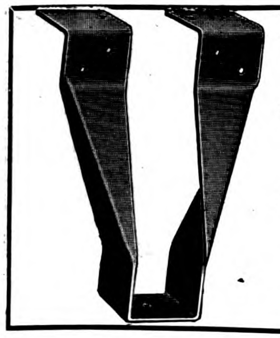

641




Grand Rapids
SOLID STEEL BALLS
SOLID STEEL CONE AXLE
ANTI-FRICTION BALL BEARING
Grand Rapids


Copper Cable Chain


Champion Metal Chain



ASK YOUR DEALER FOR

Lane Bros. Co.

JOIST AND TIMBER HANGERS.

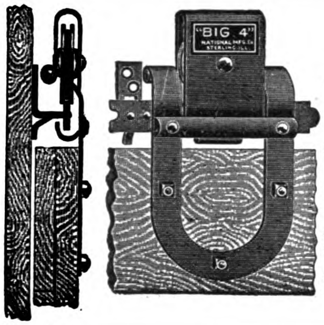
Made in more than one hundred listed sizes. Any special size or modification to order.

Manufactured by

Lane Bros. Co.,

(THE DOOR HANGER MFRS.)

423-455 Prospect St., POUGHKEEPSIE, N. Y.



"BIG 4"

FLEXIBLE DOOR HANGER.

Anti-Friction. Cannot Jump the Track. Exclusive Sale Given.

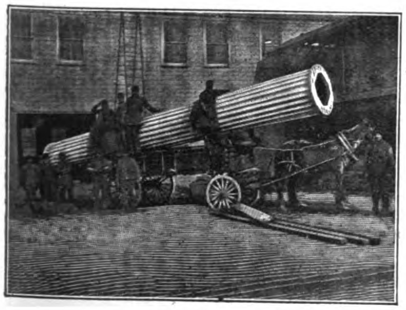
NATIONAL MFG. CO.,

STERLING, ILL.

Grand Rapids Wood Carving Co.,

GRAND RAPIDS, MICH.

Catalogue on application.



THE LARGEST LOCK JOINT COLUMN EVER BUILT.

40½" in diameter, 33-10 in. long

One of four furnished by us for the Portico of the Allenhurst Club, Allenhurst, N. J.

HARTMANN BROS. MFG. CO.

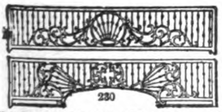
Mt. Vernon, N. Y., U. S. A.
New York Office: 1123 Broadway.
Also
Henry Sanders Co., Chicago, Ill.
A. J. Koll Planing Mill Co.,
Los Angeles, Cal.

MANUFACTURERS OF

KOLL'S PATENT LOCK JOINT COLUMNS FOR PERGOLAS, PORCHES OR INTERIOR USE.

Send for Catalogue D 19.

GRILLES "Direct from Factory" MANTELS



No. 225—48x12 inches, **$3.60.** Retail value, $7.00.
No. 230—48x14 inches, with Curtain Pole, **$4.50.** Retail value, $9.00.
Others from $2.50 up. Largest assortment. Division Screens and special Grilles to order.

Tile and Mosaics for everywhere. Walls, Floors, etc.

$13.25 buys this solid oak Mantel, 80 in. high, 54 or 60 inches wide, 28 x 16 Mirror. Heavy columns and elaborate capitals. Tile facing and hearth with Plated Frame and Club House Grate, $10. extra.

HARDWOOD FLOORS

will last as long as the house. Any carpenter can lay it easier than ordinary flooring. Get our prices.

Write for catalog of Mantels, Grates, Tiles for floors and baths, Slate Laundry Tubs, Grilles, etc. It is free. Or send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from **$12** to **$200.**

W. H. OSTENDORF, - - - - - - 2923 N. Broad St., Philadelphia, Pa.

King's Automatic Weather Strip.

Window and Door Stop.

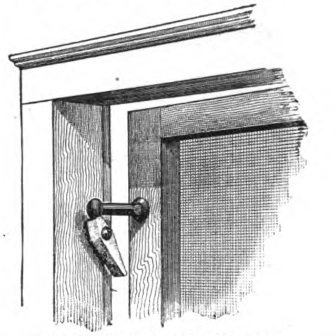
The only perfectly satisfactory weather strip, window and door stop on the market.
Keeps out cold and dust.
Makes a perfectly tight joint.
Windows can be raised and lowered to desired position without the use of fasteners or of weights.
Do not build a house until you have investigated the merits of these strips.
Write for prices.

MANUFACTURED BY

The King Manufacturing Co.

Newton, Ia.

"DIME" SCREEN DOOR CHECK.



CALDWELL MFG. CO.,

5 Jones Street, ROCHESTER, N. Y.

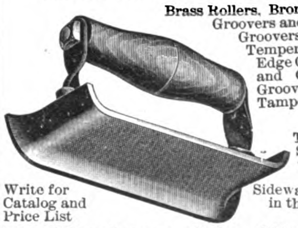
GRINDSTONES.

Mounted Grindstones for Carpenters' or Anybody's Use.

THE CLEVELAND STONE CO.,

6th Floor, Hickox Bldg. CLEVELAND, O.

Try "Best" Spring Tempered Steel Edge Groovers and Center Groovers



Brass Rollers, Bronze Edge Groovers and Center Groovers, Spring Tempered Steel Edge Groovers and Center Groovers, Iron Tampers, etc.

The Most Satisfactory Cement Sidewalk Tools in the World

Write for Catalog and Price List

The Woodhouse Hdw. Mfg. Co.

2620 So. 13th St., St. Louis, Mo.

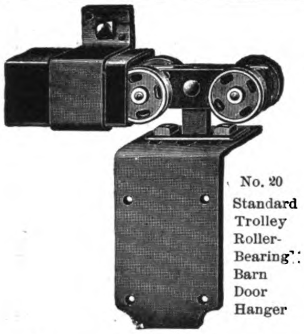
Forest City Bit & Tool Co., Rockford, Ill., U S A

Manufacturers of Wood Boring Bits, Hollow Mortising Chisels, Common Mortising Chisels and Tools
Send for CATALOG "G" Send for

Digitized by Google

Original from UNIVERSITY OF MICHIGAN

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google



No. 20 Standard Trolley Roller-Bearing Barn Door Hanger

RICHARDS

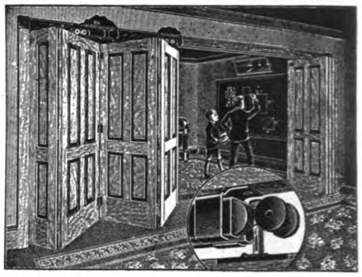
DOOR HANGERS

are the best.

Made for sliding doors of all sizes and weights.

Popular with architects and builders.

Sold by dealers.

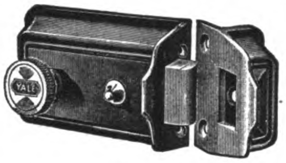


No. 135 Ball-Bearing Swivel Door Hanger for folding doors. Vertical Adjustment.

The Richards Mfg. Co., Aurora, Ill.

New York Office, 101 Reade St.

Send for Catalogue of Door Hangers, Fire Door Fixtures, Conveying Systems.



A Little Talk About Night Latches.

A Night Latch is a lock having a spring bolt, operated by a key from the outside and by a knob from the inside, with a "stop" whereby the bolt may be fastened back if desired.

The weak places about most night latches is the fact that a knife blade or wire may be inserted in the crack of the door and the bolt forced back and the door opened.

The Yale & Towne *Rim* Night Latch No. 242 shown above frustrates such tampering. When the knife blade is inserted it enters the crack shown between the head and body of the bolt and the least pressure automatically deadlocks the bolt so that it is impossible to gain entrance. This feature, combined with the pin-tumbler mechanism and paracentric key way, make the Yale No. 242 the most secure night latch made.

"Yale & Towne Mfg. Co." on a lock is a guarantee that you are getting the best in design, material and workmanship which can be produced for the price. The night latch line includes a vast variety of designs and sizes, retailing from $.25 to $5.00.

For *best* security get a lock with the word YALE upon it.

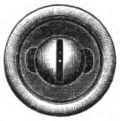
Yale & Towne Locks, Padlocks, Builders' Hardware, Door Checks, etc., may be had from all hardware dealers. Printed matter of interest to carpenters and builders will be sent on request.

THE YALE & TOWNE MANUFACTURING CO.,

9 Murray Street, - - NEW YORK

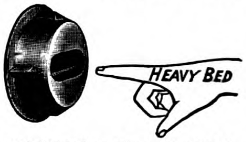
THE IVES' PATENT WINDOW STOP ADJUSTER

PATENTED



FOR WINDOWS AND SLIDING DOORS

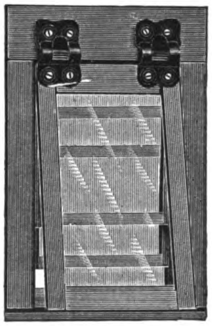
Insures Protection against Cold Draughts, Dust, Rattling or Binding.



The only Window Stop Adjuster made from one piece of metal that has a heavy bed that will not bend or cup in tightening the screw.

THE H. B. IVES CO.

40 Page Catalog mailed free. **New Haven, Conn., U. S. A.**



Full-length window screens keep out all the flies and protect the windows. Screens attached with

GOSSETT'S Detachable Suspension HINGES

are easily put up or removed—no tools or ladder necessary. Write for free sample pair. Price per Doz. pairs $1.20 (Express paid), Sold by Hardware and Lumber Dealers.

Manufactured by

F. D. KEES MFG. CO. Beatrice, Nebr.

The Cement Worker's Hand Book

By W. H. BAKER

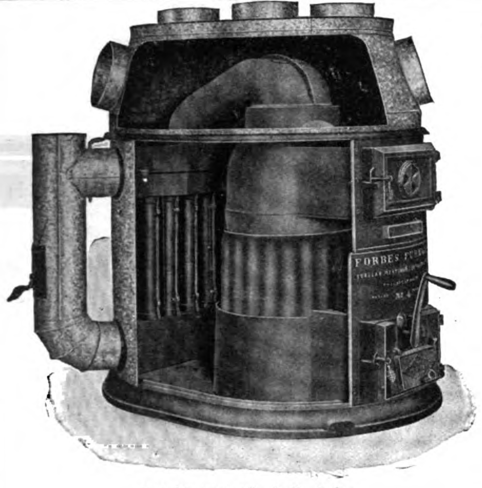
is compiled to meet the requirements of the workman.

Provides an insight into the mixing and handling of cements, mortars and concretes for building and other purposes.

Pocket Size. 86 Pages.

FIFTY CENTS, POSTPAID

DAVID WILLIAMS COMPANY
14-16 PARK PLACE - NEW YORK



Height over all, 4 ft. 3 in.

THE FORBES FURNACE

Burns Either Hard or Soft Coal

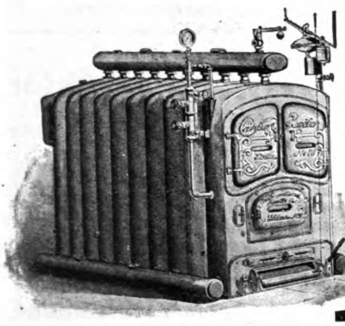
EVERY ONE GUARANTEED
IF PROPERLY INSTALLED

No Sheet Iron Drums—Entirely Cast Iron —Radiating Drums 1-8 Inch Thick, Will Wear for Years

YOU RUN NO RISK IN PUTTING IN THE FORBES FURNACE

SEND FOR CATALOG AND FULL PARTICULARS

Tubular Heating & Ventilating Co.
228 Quarry St., Philadelphia



FOR LARGE WORK

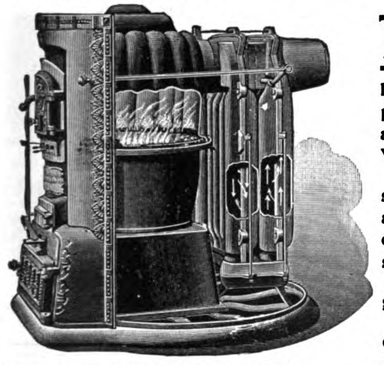
There is Nothing Better than a

CARTON STEAM BOILER

If you are figuring on a large contract investigate a little. Ask your local dealer if he refuses to talk our line, write us, giving his name.

INTERNATIONAL HEATER CO.
UTICA, N. Y.
New York Boston Chicago

THE BEST IS THE CHEAPEST



The BENGAL FURNACE

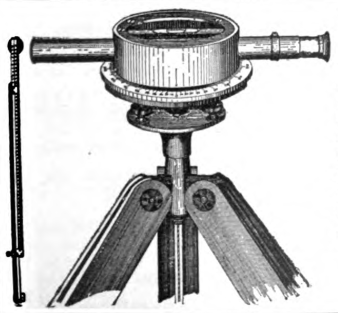
has stood the crucial tests imposed upon it in various places and always came out the victor.

The best evidence of its superiority is that imitators are trying to sell their wares on the merits of the BENGAL, saying it is "just as good."

There are none "just as good."

Full particulars on application.

THE FLOYD-WELLS CO., - Royersford, Pa., U. S. A.



WHAT BUILDERS HAVE BEEN LOOKING FOR

BOSTROM'S
Improved Builders' Level

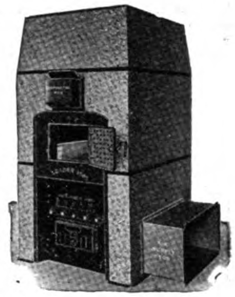
An absolutely reliable leveling instrument for Architects, Builders, Carpenters, and Stone Masons. Can be used for any kind of foundation work and getting angles, is simple in its construction, easily understood, and can be operated by any one. Is made of Brass, oxidized, and has a silvered circle of degrees. Has achromatic Telescope of ample power for such work. Price. including Plumb Bob, Tripod and Graduated Rod and Target, $25.00. Write for circular and be convinced. Every instrument guaranteed.

BOSTROM-BRADY M'F'G CO.,
53½ West Alabama Street,
Atlanta, Ga.

"How to Set Up Your Own Furnace"

Free

Whether you're building a new house or have an old one; whether it is a school, store, church or other place to heat, you need our brand new illustrated furnace book, "Modern Furnace Heating." It is valuable, instructive; a 40-page book that explains the mysteries of house heating, ventilating, where to put the furnace, how to locate the registers, pipes, chimney, etc. It tells how to warm fresh oxygen from outdoors, without introducing cold drafts. A detailed explanation is given of how we sell the

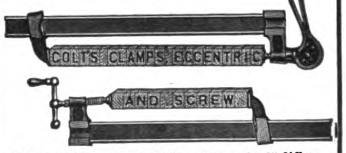


No. 45 Leader Steel Furnace

for $49 and pay freight east of Omaha; how you can set up this furnace without expert help from plans we furnish free. Write for this excellent book. It s free. Send us a plan of your building. We'll send estimate free. Do it now.

Hess Warming & Ventilating Company,
709 Tacoma Building, Chicago, Ill.

COLT'S CLAMPS



Quick Acting—Time Saving. We make 35 different styles of Clamps to meet the requirements of all classes of WOODWORKERS.

Ask for catalogue No. 129.

BATAVIA CLAMP CO.
23 Center St., Batavia, N. Y.

WORTHLEY'S
PATENT

SLOW FEED MANGER

17-Inch Size, $1.60 each.

U are welcome to a copy of our
VANE CATALOGUE

BROAD GAUGE IRON STALL WORKS,
53 Elm St., Boston, Mass.

MANY TIMES

we are asked if we have small pamphlets or circulars covering some particular line of Tools or Hardware which we can send in place of a large and expensive catalogue. For this reason we issue the following catalogues, each complete in itself:

TOOLS

No.	
No. 1959	Glue and Varnish Brushes.
" 1960	Imported French Band Saws.
" 1961	Work Benches.
" 1962	Hand Screws, Clamps, etc.
" 1963	Mitre Boxes, Trimmers, etc.
" 1964	Files and Rasps.
" 1965	Saws.
" 1966	Planes.
" 1967	Tool Chests.
No. 1968	Adjustable Circular Saw Vise.
" 1969	Goodell "All Steel" Mitre Box.
" 1970	Roe's Patent Angle Steel Pocket Tape.
" 1971	Yankee Tools.
" 1972	Universal Square.
" 1973	Wood Carver's Tools.
" 1974	Automatic Mitre Clamp.

HARDWARE

No.	
No. 1975	Sliding Door Rail and Sheaves.
" 1976	Storm Sash Hangers and Fasteners.
" 1977	Stamped Stationary Drawer Pulls.
" 1978	Blount Door Checks.
" 1979	Corbin Door Checks.
" 1980	Bardsley Door Checks.
" 1981	Bommer Spring Hinges.
" 1982	Glass Knobs.

Copies may be had by application, but above numbers must be specified.

HAMMACHER, SCHLEMMER & CO.,

HARDWARE, TOOLS AND SUPPLIES

NEW YORK, SINCE 1848.

4th Avenue and 13th Street.

(Block South of Union Square.)

TOWER'S CHAMPION SCREW DRIVERS

FOR SIXTEEN YEARS THE ACKNOWLEDGED STANDARD.

Every Blade Is Tested to Split a Screw Head.

AVOID Imitations of CHAMPION Screw Drivers. None Genuine without the name "CHAMPION" which is our Trade Mark and Guarantee.

TOWER & LYON CO.

95 Chambers Street, New York.

"Forstner" Brace and Machine Bits

For Fine Carpenter, Cabinet and Pattern Work

Specially Adapted for Hardwood Working.

The Forstner Labor-Saving Auger Bit, unlike other bits is guided by its *Circular Rim* instead of its centre; consequently it will bore any arc of a circle and can be guided in any direction regardless of grain or knots, leaving a true polished surface. It is preferable and more expeditious than chisel, gouge, scroll-saw, or lathe tool combined, for core-boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon moulding and mortising, etc.

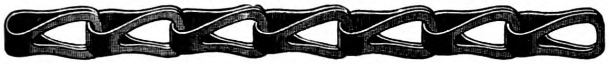
To introduce this high grade tool among carpenters, pattern makers, and others, we will mail to any reader of "Carpentry and Building," upon receipt of 50c. any bit we make from ¼ inch to 1 inch in size.

Manufactured by

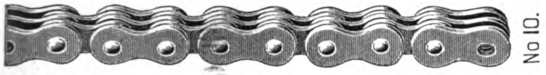
The Progressive Mfg. Co., Dept. "A", Torrington, Conn.

Enquire of your Hardware Dealers or write us direct. Supplied in Sets. Write for Catalogue.

SASH CHAIN



CABLE CHAIN



JACK CHAIN

The SMITH & EGGE MFG. CO.

Bridgeport, Conn.

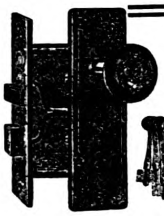
Manufacturers of **"Giant Metal" Sash Chains**
" " **"Red Metal"** " "

Cable Chains, Jack Chain, Bell Hangers' Chains and Plumbers' Chains
Made in Brass, Copper and Steel

WRITE FOR CATALOGUES AND PRICES

We are the ORIGINATORS of SASH CHAIN as a SUBSTITUTE for sash cord

---



Builders' Hardware

FREE

Our Catalog with net prices sent to contractors and material men upon request.

New Illustrated Catalog and Net Price List.

This publication contains latest designs and finishes in builders' hardware, with over 1000 illustrations and 40 different designs in 15 different finishes.

REHM HARDWARE CO., 354 Blue Island Ave., Chicago, Ill.

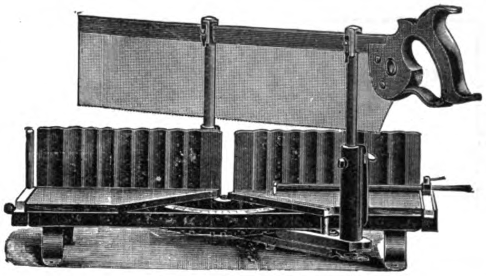
GOODELL MITRE BOX

MADE ENTIRELY OF STEEL. NO MORE BREAKING.
FIRST IN QUALITY AND IMPROVEMENTS.

AUTOMATIC STOPS FOR HOLDING UP SAW.
CORRUGATED BACKS. GRADUATED.
GAUGE FOR DUPLICATE CUTS and many other features.

If you want the best you will take no other.
Send for Circular K.

GOODELL MFG. CO., Greenfield, Mass.

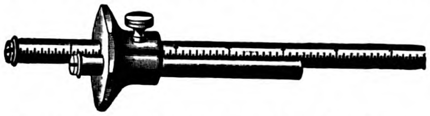


THE AKRON ECLIPSE LEVELS

Manufactured by **The BAKER McMILLEN CO.** AKRON, OHIO.

We have a proposition that will interest every carpenter. Drop us a postal and we will send it to you.

CAUTION!



We have purchased all the patents of Barret's Improved Combination Roller Gauge, and caution all parties against buying or selling these Gauges that are not made by us and with our name stamped upon each Gauge. We are able to and shall protect our rights to the full extent of the law.

THE LEAVITT MACHINE CO., ORANGE, MASS.

FURNACE HEATING.

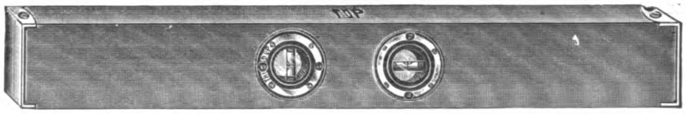
By William G. Snow

With an Appendix on Furnace Fittings.

170 Pages; 90 Illustrations; Size, 6 x 9 inches.
Cloth bound. Price, $1.50.

DAVID WILLIAMS CO.
14-16 Park Place, - New York

COOK'S LEVEL

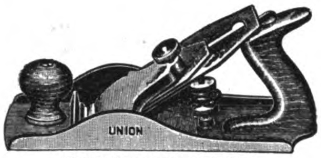


For Carpenters, Machinists, Masons.

MADE OF WOOD, IRON, ALUMINUM.
Of all Dealers, or Catalogue on Request.

EVERY LEVEL WARRANTED.

DAVIS & COOK, Watertown, N. Y.



Union X4 Iron Smooth Plane.

THE GOOD WORKMAN DEMANDS

GOOD TOOLS

UNION "X" PLANES

Union X22 Wood Smooth Plane.

Supply that demand, and it is not difficult to convince the Good Workmen of the Country that they are the Planes they want. They are rigid and solid, easy of adjustment, but a Plane that will "stay set" when adjusted.

A FIRST-CLASS PLANE

The cutters are of heavy steel and the same thickness throughout. This feature, together with the solid Frog, make a Plane that WILL PLANE. Every essential feature of it is right, and properly designed, and properly made.

Send for our No. 5 Catalogue, which shows the full line of Planes, Scrapers, etc, etc.
It will interest you.

Union No. X5 Iron Jack Plane.

Union Manufacturing Co.,
NEW BRITAIN, CONN., U. S. A.
WAREHOUSE: 108 Chambers St., New York.

Union No. X26 Wood Jack Plane.

HARGRAVE WOOD DRILLS

Made of the best material, forged and not milled. Especially adapted to hard wood, and will not be injured by coming in contact with a nail or screw, and, having a longer point, cuts much faster than a metal drill. Bores a smooth hole in any direction; will not split the wood nor turn aside from the grain or knots. Speed and feed are entirely under the control of the operator.

BEST { QUALITY, FINISH, DESIGN.

Specify these goods to your dealer.
TAKE NO OTHER.
Send six cents for cat. No. 200.

The Cincinnati Tool Co.
Norwood, CINCINNATI, O.

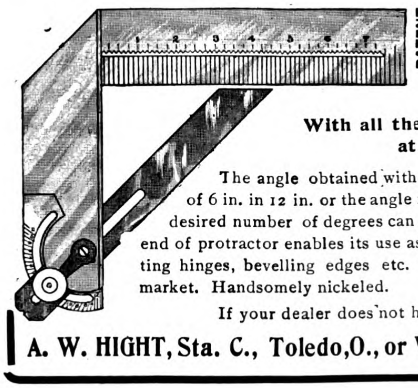
Will Not Bend.

Hardened and Tempered.

30 in. and 36 in. long.

DEMAND one with our name on it, and have the BEST.

KRAEUTER & CO.
NEWARK, N. J.



PATENT APPLIED FOR

HIGHT'S UNION COMBINATION SQUARE

With all the Combinations Available at the Same Time

The angle obtained with its use is one that will give a rise of 6 in. in 12 in. or the angle for bottom of rafter for ¼ pitch. Any desired number of degrees can be obtained instantly. The notch in end of protractor enables its use as a gauge for getting in corners, setting hinges, bevelling edges etc. The best tool of its kind on the market. Handsomely nickeled.

If your dealer does not have them send $1.00 to

A. W. HIGHT, Sta. C., Toledo, O., or W. B. Colp, Ballard, Wash.

Intricate Figuring Not Required.

Did you ever get more than a partial mastery of the formula ordinarily employed for calculating the strength or bearing capacity of beams, floors and roofs, and how much of it can you put into practical use?

Kidder's Strength of Beams, Floors and Roofs

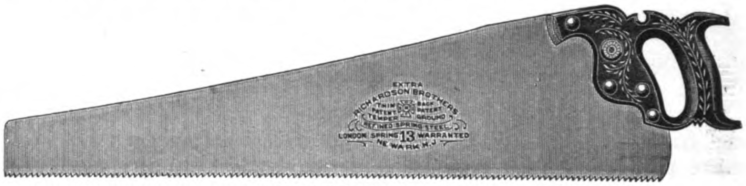
is a book designed for the man who is not versed in mathematics.

Prepared specially to meet the requirements of young architects, carpenters, builders, and within the reach of any one who is interested in building construction.

222 Pages; 164 Illustrations
$2.00 Prepaid.

DAVID WILLIAMS COMPANY,
14-16 Park Place, NEW YORK

OLD RELIABLE RICHARDSON SAWS.



ESTABLISHED 860.

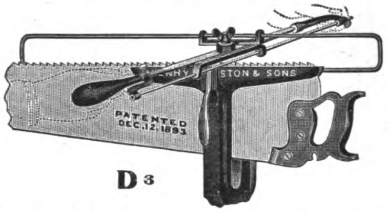
The peer of them all. Try one and be convinced. Every saw fully warranted.

NATIONAL SAW CO. Operating Richardson Bros. **NEWARK, N. J.**

DISSTON Filing Guide and Clamp.

Especially Designed to assist those not skilled in the art to file a saw correctly.

IT'S PRACTICAL
SEND FOR
DESCRIPTIVE
CIRCULAR.

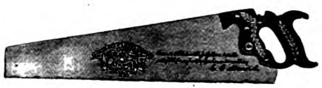


THIS GUIDE IS
FITTED TO THE
DISSTON Nos. 2 and 3
CLAMPS.

HENRY DISSTON & SONS, INC.,
KEYSTONE SAW, TOOL, STEEL & FILE WORKS,
PHILADELPHIA, PA.

ATKINS HIGH GRADE SILVER STEEL SAWS

Do more work and do it easier than any other. Because they're made right—by men that know how—Our name on every blade. Ask your Dealer for an Atkins.



E. C. ATKINS & CO., Inc.,
Home Office and Factory, - - - **Indianapolis**

BRANCHES: Atlanta, Chicago, Memphis, Minneapolis, New Orleans, New York City, Portland, Seattle, San Francisco, Toronto.

THE new fourteenth edition of **Kidder's Architects' and Builders' Pocket Book** is regarded as a necessity by progressive builders and architects. It covers the whole field of building, architecture and structural engineering.

A suggestion of the great scope of this edition is indicated by the enlargement from 857 pages, as contained in the preceding edition, to the 1656 pages of the present edition. The parts of the older work utilized have been revised to conform with the latest practice.

SIZE 4 x 7 INCHES; GILT EDGES; MOROCCO BINDING. FIVE DOLLARS PREPAID.

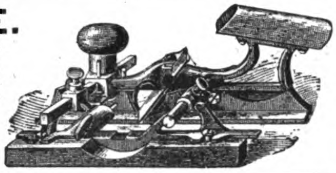
DAVID WILLIAMS COMPANY,
BOOKSELLERS
14-16 PARK PLACE NEW YORK.

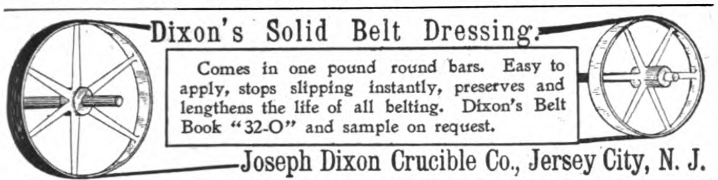
FALE'S PAT. PLANE.

Constituting Carpenter Plow, Dado, Filletster, Matching Sash, Hollows, Rounds, Beads, Rabbets, Nosings, Case Mouldings, Quarter Rounds, &c. The most Compact and Serviceable Tool ever invented. Universally endorsed by carpenters.

AGENTS WANTED.

OTIS A. SMITH. Sole Mfr., Rockfall, Conn.





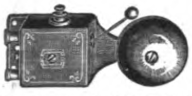
Dixon's Solid Belt Dressing.

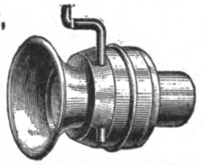
Comes in one pound round bars. Easy to apply, stops slipping instantly, preserves and lengthens the life of all belting. Dixon's Belt Book "32-O" and sample on request.

Joseph Dixon Crucible Co., Jersey City, N. J.

W. R. OSTRANDER & CO., 22 Dey Street, New York City,

Manufacturers of
Speaking Tubes, Whistles, Elevator, House and Hotel Annunciators and Bells, Electric Light Supplies.
Send for Catalogue.





Factory, 1431-1439 DeKalb Avenue, Brooklyn.

"Yankee" Tools.

No. 41—AUTOMATIC DRILL.

No. 42—AUTOMATIC DRILL.

No. 50—RECIPROCATING DRILL FOR WOOD OR METALS.

The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up to date mechanic could buy tools of their quality and character. Other tools are very good tools, but "Yankee" Tools are better. "Yankee" Tools are sold by all leading dealers in Tools and Hardware. Ask your dealer to see them. Our Yankee Tool Book tells all about them. Sent free by

NORTH BROS. MFG. CO., Philadelphia, Pa.

A TOOL THAT'S STAMPED
STANLEY
IS THE BEST OF IT'S KIND

IMPROVED CARPENTERS' TOOLS

Sold by all Hardware Dealers

Stanley Rule and Level Co.
NEW BRITAIN, CONN., U. S. A.

A COMPLETE FRAMING RULE
ON
NICHOLLS FRAMING SQUARE.

On the square is where the carpenter wants his figures, not in a book or on a piece of paper, as they are usually lost.

NICHOLLS MFG. CO.,
OTTUMWA, IOWA.

We have now ready our **New Illustrated Catalogue No. 19** devoted exclusively to

Wood Workers' Tools

Containing **250** pages, **1100** illustrations, handsomely printed on good paper, it makes a convenient and valuable book for **all woodworking mechanics.**

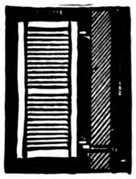
Sent to any address on receipt of 10 cents postage.

WM. P. WALTER'S SONS,
TOOL HEADQUARTERS
1233 Market St., Philadelphia.

Mallory Shutter Worker.

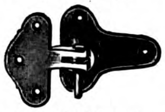
Works and locks the blinds from the inside. Ornamental, durable, perfect working. Applicable to old or new buildings.

Manufactured by
MALLORY MFG. CO.,
Flemington, N. J.



Automatic Blind Hinges

HALE & BENJAMIN'S PATENT



Flush and surface for wood and brick building. Easy to put on, strong and durable. **Warranted.** Also combination awning hinges. With these hinges blinds will not slam or blow off. They are the only hinges adapted to bay or mullion windows, as they require no other fixtures. Testimonials on request from dealers, contractors, and people who have used them several years. We are the sole owners of these two patents. If your dealer does not keep them write to

PARKER WIRE GOODS COMPANY,
Manufacturers,
No. 1 Assonet Street, Worcester, Mass.

Use Our
Folding and Adjustable
Handle Draw Knife!

It is adjustable to any position, adaptable to the awkward places, absolutely rigid when set, handy and compact, a time saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

Write for Prices and Discounts.

A. J. WILKINSON & CO.,
180-188 Washington St., Boston, Mass., U.S.A.

The Rich Handy Drawing Outfit

Saves Time

for the draughtsman, and is a great aid to the learner. It holds a number of sheets or a pad, which requires no fastenings. The Protractor T Square gives accurate angles. You get measurements direct from the board. Has a drawer for instruments, and can be carried around to make drawings on the spot. Circulars free.

J. & G. RICH, 122 N. 6th St., Phila., Pa.

Send for Catalogue No. 62

Giving description of books on Architecture, Building, Engineering and allied subjects. Sample of "Architects & Builders Magazine" sent on request.

Published monthly at $2.00 a year. Foreign Subscriptions, $3.00 a year.

WM. T. COMSTOCK, Pub., 23 Warren Street, N.Y.

20,000 CONTRACTS

would be considered a good record. We have lighted over that number of churches alone in all parts of the world. A pretty sure guarantee of satisfactory work. Correspondence invited.

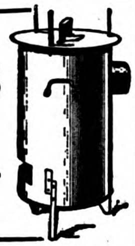
I. P. FRINK, 551 Pearl St., New York.

A 7½ HAND SAW

This is not a PRIZE but a JEWEL. If your dealer cannot furnish you one of our CELEBRATED NARROW A 7½ HAND SAW, 6 inch at butt, 1½ inch at point, 4 gauges thin on back, send us P. O. Order for $2.00 and we will send, express prepaid, 26 inch SAW in Canvas Scabbard.

C. E. JENNINGS & CO.,
101 Reade Street, NEW YORK.
SOLE MANUFACTURERS.

Plasterer's DRYING STOVES



2 sizes
Send for price.

The S. M. Howes Co.,
40-46 Union St.
BOSTON, MASS.

STANDARD FOR 30 YEARS

This name stamped on every three feet is a guarantee that you are getting the best sash cord that can be made.

SILVER LAKE CO.,
Boston, Mass.

FREE 600 PAGE CATALOG

Over 20,000 labor saving, money saving articles for the shop, home or farm, fully illustrated, described and priced in our NEW 600 PAGE CATALOGUE No. 90. Also a larger variety of MECHANICS' TOOLS of all kinds at LOWER PRICES than heretofore shown in any catalogue ever published.

WHY NOT BUY AT WHOLESALE PRICES?

No mechanic should be without this valuable book. If you have not received our catalogue, write us to-day and it will be sent you FREE OF CHARGE

Send for our new PREMIUM LIST, containing 100 useful and valuable articles given away. Most wonderful offer ever made. SEND FOR IT TO DAY.

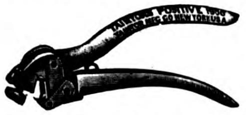
FREIGHT RATES ARE LOWER FROM NEW YORK THAN ELSEWHERE. BUY IN NEW YORK

White, Van Glahn & Co.

Dealers in Reliable Merchandise Since 1816.
14 Chatham Square, New York City

OLDEST MAIL ORDER HOUSE IN AMERICA

TAINTOR Positive Saw Set



TRY IT If you like it tell others
If you don't like it tell US

Send for our circular which contains HINTS on the

CARE of SAWS

Free on application.

TAINTOR MFG. CO.
113 Chambers St., New York

MONARCH Sash Chain

IS THE BEST.

Samples free. Mention this paper.

The Bridgeport Chain Co.
Bridgeport, Conn.

SAMSON SPOT CORD

Distinguished by our trade-mark, the Colored Spot.

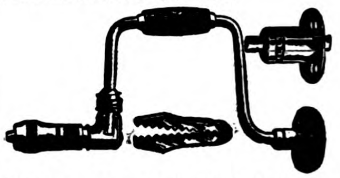
Outwears any other device for hanging windows.

SAMSON CORDAGE WORKS, Boston, Mass.

Ask for MILLERS FALLS CO.'S BIT BRACES

Series Nos.	30	31	32	33
	14	12	10	8 inch sweep.

There are no other braces made which match them in merit and beauty of finish.



Our name appears on all genuine goods. Look for it before you buy. If your dealer does not keep Millers Falls Braces then write to us.

Millers Falls Company
28 Warren Street, New York, N. Y.

BARGAINS

We have made by mistake three sizes of short Auger Bits, which we offer at much less than cost. These have the patented concave twist and are high grade tools in every respect. The entire length is 6⅛", length of twist 3". Will send you one or more, postage prepaid :—6-16", twelve cents in stamps; 7-16", fourteen cents; 9-16" sixteen cents.

FORD AUGER BIT CO.
Holyoke, Mass.

BURLINGTON
VENETIAN BLIND CO.
MAKERS OF
BLINDS
AND SCREENS
BURLINGTON, VT.

Starrett Universal Scraper

No. 194. Of all the tools which we have brought out in recent years none has met the instant approval of both mechanics and dealers so completely and unanimously as this scraper. It has all edges ground perfectly square, which by using both sides gives it eight sharp cutting edges, any one of which can almost instantly be brought into use by means of the ball joint connecting handle. By a slight turn of same the ball joint is frictionally locked or released, or placed at any angle desired to get into corners and to tip the scraper blade so as to give the most effective cut.

The guard, which may be instantly slipped off and on either end or side of the blade, together with the finely shaped handle, enables one to use it with a strong, firm grip, bearing on either heavily or lightly to effect the best results. In fact, it is the neatest, simplest and best scraper in its line ever made for use on floors, benches, meat blocks, etc.

Send for free Catalogue No. 17 P of Fine Mechanical Tools.

The L. S. Starrett Company,
ATHOL, MASS., U. S. A.

Price, prepaid, 75c.

Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

Vol. XXVIII. No. 8. New York, August, 1906. Ten Cents a Copy. One Dollar a Year.

Alphabetical List of Advertisers.

American Column Co.	57
American Rolling Mill Co.	11
American School of Correspondence	10
American Wood Working Machinery Co.	8
Asphalt Ready Roofing Co.	1
Atkins, E. C. & Co.	66
Automatic Sash Holder Co.	18
Baker McMillen Co.	63
Barnes, W. F. & John Co.	4
Barnes Tool Co.	11
Barnett, G. & H., Co.	1
Batavia Clamp Co.	61
Berger Mfg. Co.	11
Bommer Bros.	1
Boston Bolt Co.	11
Bostrom-Brady Mfg. Co.	64
Boynton Furnace Co.	18
Bradt Pub. Co.	11
Bridgeport Chain Co.	68
Broad Gauge Iron Stall Wks.	61
Burlington Venetian Blind Co.	68
Burritt, A. W. Co.	57
Burt Mfg. Co.	16
C. A. Mfg. Co.	16
Cabot, Samuel	1
Caldwell Mfg. Co.	59
Canton Steel Roofing Co.	15
Cement Machinery Co.	8
Chattanooga Roofing & Fdy. Co.	51
Chicago Machinery Exchange	6
Chicago Metal Covering Co.	58
Cincinnati Tool Co.	63
Cleveland Stone Co.	59
Columbia Mineral Wool Co.	18
Comstock, Wm. T.	68
Cordesman, Meyer & Co.	8
Cordesman-Rechtin Co.	7
Cortright Metal Rfg. Co.	13
Crescent Machine Co.	7
Davis & Cook	64
Diamond Expansion Bolt Co	11
Dieckman, F.	15
Disston, Henry & Sons	66
Dixon, Jos., Crucible Co.	67
Drouve, G. Co.	15
Eastern Granite Roofing Co	14
Eaton & Prince	51
Edwards Mfg. Co.	8
Eller Mfg. Co.	14
Energy Elevator Co.	17
Enterprise Fdry. Co.	9
Fay, J. A. & Egan Co.	5
Floyd, Wells Co.	61
Ford Auger Bit Co.	68
Forest City Bit & Tool Co.	59
Foster Munger Co	61
Fox Machine Co.	8
Fox, P. L.	65
French, Samuel H. & Co.	16
Frink, I. P.	68
Gage Tool Co.	18
Globe Ventilator Co.	16
Goodell Mfg. Co.	60
Grand Rapids Hdw. Co.	8
Grand Rapids Wood Carving Co.	59
Hamlin, George R.	11
Hammacher, Schlemmer & Co.	62
Hartmann Bros. Mfg. Co.	59
Hess Warming & Ventilating Co.	61
Hight, A. W.	64
Hitchings Co.	51
Howes, S. M., Co.	68
Hurley Machine Co.	3
Ideal Concrete Machinery Co.	9
Interior Hardwood Co.	1
International Cor. Schools	7
International Heater Co.	61
Ives, Hobart B. & Co.	60
Jennings, C. E. Co.	68
Johnson, E. J., Co	14
Kanneberg Rfg. & Ceil. Co.	16
Karol, B. C.	8
Kees, F. D. Mfg. Co.	60
Keighley, S. Metal Ceiling & Mfg. Co.	13
Kidder, R. E.	15
Kimball Bros. Co.	17
King Mfg. Co.	59
Kinnear & Gager Co.	11
Kraeuter & Co.	63
Lane Bros. Co.	59
Leavitt Machine Co.	63
Lestershire Lumber & Box Co	16
Long Island Machinery Co.	5
Lord & Burnham Co.	51
Lorenzen, Chas. F. & Co.	73
Mallory Mfg. Co.	67
Marston, J. M. & Co.	5
Mesker & Bro.	15
Meyers, F. J. Mfg. Co.	17
Miller, A. W., Mfg. Co.	66
Millers Falls Co.	68
Montross Metal Shingle Co.	14
Morse, Williams & Co.	17
Morton, Thomas	58
Mullins, W. H. Co	13
National Mfg. Co.	59
National Roofing Co.	8
National Saw Co.	66
Nat'l Sheet Metal Rfg. Co.	16
New Jersey Zinc Co.	14
N. Y. Steel Corner Plate Co.	16
N. Y. Telephone Co.	15
Nicholls Mfg. Co.	65&67
North Bros. Mfg. Co.	67
O. K. Harry Steel Wks.	5
Ostendorf, W. H.	59
Ostrander, W. R. & Co.	67
Parker Wire Goods Co.	67
Parks Ball Bearing Machinery Co.	5
Peerless Brick Mch. Co.	6
Pettyjohn Co.	9
Phila. & Boston Face Brick Co.	18
Pike Mfg. Co.	1
Progressive Mfg. Co.	62
Reed & Auerbacher Co.	18
Rehm Hardware Co.	60
Rich, J. & G.	67
Richards Mfg. Co.	60
Sackmann, F. A.	5
Samson Cordage Works	68
Schaller-Hoerr Co.	58
Scott & Co.	11
Sedgwick Mch. Works	17
Seneca Falls Mfg. Co.	4
Shimer, Samuel J. & Sons	7
Silver Lake Co.	68
Simonds Mfg. Co.	18
Smith, Otis A.	67
Smith & Egge Mfg. Co.	63
Standard Paint Co.	12
Stanley Rule & Level Co.	67
Stanley Works	1
Star Encaustic Tile Co.	13
Starrett, L. S. Co.	1&68
Stowell Mfg. Co.	12
Strelinger, C. A. Co.	65
Taintor Mfg. Co.	68
Topp, G. A. & Co.	12
Tower & Lyon	62
Tubular Heating & Ventilating Co	61
Union Mfg. Co.	64
U. S. Mineral Wool Co.	18
Van Dorn Iron Wks. Co.	5
Waddell Mfg. Co.	58
Walters, Wm. P. Sons	67
Warner Elevator Mfg. Co.	17
Washburne, E. G. & Co.	11
Wheeling Corrugating Co.	12
White, Van Glahn & Co.	68
Wilkinson, A. J. & Co.	67
Willis Mfg. Co.	13
Woodhouse Hdw. Mfg. Co.	59
Wood-Mosaic Flooring Co.	18
Yale & Towne Mfg. Co.	60

Classified List of Advertisers.

Annunciators
Ostrander, W. R. & Co.

Architects' Blue Prints

Architects' Details
Lestershire Lumber & Box Co.

Asbestos
Stowell Mfg. Co.

Auger Bits
Ford Auger Bit Co.
Jennings, C. E. Co.

Awnings
Chattanooga Roofing & Fdry. Co.
O. K. Harry Steel Works

Band Saws
American Wood Working Machinery Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Crescent Machine Co.
Fay, J. A. & Egan Co.

Barrel Swings
Leavitt Machine Co.

Blackboards, Slate
Johnson, E. J. Co.

Blinds
Burlington Venetian Blind Co.
Foster-Munger Co.
Schaller-Hoerr Co.

Blind Hinges
Parker Wire Goods Co.
Stanley Works

Bolts and Nuts
Boston Bolt Co.

Books
Arthur, Wm.
Bradt Pub. Co.
Comstock, Wm. T.
Williams, David, Co.

Boring Machines
Fox Machine Co.
Millers Falls Co.

Brick Machinery
Cement Machinery Co.
Peerless Brick Machine Co.

Builders' Hardware
Boston Bolt Co.
Hammacher, Schlemmer & Co.
Rehm Hardware Co.
Yale & Towne Mfg. Co.

Building Brackets, Folding
Stanley Works
Tower & Lyon Co.

Building Material
Lestershire Lumber & Box Co.

Building Paper and Felt
Cabot, Samuel.
Standard Paint Co.

Builders' Supplies
Schaller-Hoerr Co.

Butts and Hinges
Stanley Works.

Capitals
Grand Rapids Wood Carving Co.
Waddell Mfg. Co.

Ceiling, Metallic
Berger Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Keighley, S. Metal Ceiling & Mfg. Co.
Kinnear & Gager Co.
Wheeling Corrugating Co.
Willis Mfg. Co.

Cement
French, S. H. & Co.

Cisterns, Steel
O. K. Harry Steel Works.

Clamps
Batavia Clamp Co.
Cincinnati Tool Co.

Concrete Block Machines
Cement Machinery Co.
Enterprise Fdry. Co.
Ideal Concrete Machinery Co.
Peerless Brick Machine Co.
Pettyjohn Co.

Conductor Pipe and Elbows
Dieckmann, F.

Conductor Pipes
American Rolling Mill.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.

Conductor Shoes
Dieckmann, F.

Conservatories
Lord & Burnham Co.

Contractors' Supplies
Boston Bolt Co.

Cornices, Sheet Metal
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mesker & Bro.
Mullins, W. H. Co.
Willis Mfg. Co.

Coverings, Metal
Chicago Metal Covering Co.

Cresting
Van Dorn Iron Works Co.
Willis Mfg. Co.

Cutter Heads
Shimer, Sam'l J. & Sons.

Designs and Details
(See House Plans)

Door Checks and Springs
Hammacher, Schlemmer & Co.

Door Checks, Screen
Caldwell Mfg. Co.

Door Hangers
Lane Bros. Co.
National Mfg. Co.

Draw Knives
Wilkinson, A. J. & Co.

Drawing Instruction
International Correspondence Schools.

Drawing Outfits
Comstock, Wm. T.
Rich, J. & G.

Drying Stoves
Drouve, G. Co.
Howes, S. M. Co.

Dumb Waiter Fixtures
Hammacher, Schlemmer & Co.

Eave Troughs
Chattanooga Roofing & Fdry. Co.
Eller Mfg. Co.
Wheeling Corrugating Co.

Elevators and Dumb Waiters
Eaton & Prince Co.
Energy Elevator Co.
Kimball Bros. Co.
Meyers, F. J. Mfg. Co.
Morse, Williams & Co.
Sedgwick Machine Works.
Warner Elevator Mfg. Co.

Etching Fluid
Reed & Auerbacher Co.

Exhaust Heads
Burt Mfg. Co.

Expansion Bolts
Boston Bolt Co.
Diamond Expansion Bolt Co.

Fencing
O. K. Harry Steel Works.

Files and Rasps
Barnet, G. & H. Co.
Boston Bolt Co:

Floor Scrapers
Hurley Machine Co.

Framing Tools
Topp, G. A., & Co.

Furnaces and Heaters
Boynton Furnace Co.
Floyd-Wells Co.
Hess Warming & Ventilating Co.
International Heater Co.
Tubular Heating & Ventilating Co.

Gas and Electric Fixtures
Frink, I. P.

Grates, Fancy Plated
Chattanooga Roofing & Fdry. Co.

Greenhouses
Hitchings & Co.
Lord & Burnham Co.

Grille Work, Wood
Foster-Munger Co.
Waddell Mfg. Co.

Grindstones
Cleveland Stone Co.
Richards Mfg. Co.

Grooving Heads
Fox Machine Co.

Hangers, Barn Door
Richards Mfg. Co.

Hangers, House Door
Richards Mfg. Co.

Hardware Jobbers
White, Van Glahn & Co.

Hardware Specialties
Richards Mfg. Co.

Hasps, Hooks and Staples
Woodhouse Hdw. Mfg. Co.

Heaters.—*Steam and Hot Water.*
International Heater Co.
Lord & Burnham Co.

Hinges, Spring
Bommer Bros.

Hinges, Window Screen
Kees, F. D. Mfg. Co.

House Plans
Comstock, Wm. T.

Iron House Fronts
Mesker & Bro.

Iron Work
Van Dorn Iron Works Co.

Lath, Metal
Wheeling Corrugating Co.

Levels
Baker, McMillen Co.
Bostrom-Brady Mfg. Co.
Davis & Cook.

Lightning Rods
Washburn, E. G. & Co.

Locks
Rehm Hardware Co.
Yale & Towne Mfg. Co.

Lumber and Shingles
Lestershire Lumber & Box Co.

Mangers, Slow Feed
Broad Gauge Iron Stall Works.

Mantels
Burritt, A. W., Co.
Foster-Munger Co.
French, Sam'l H. & Co.
Ostendorf, W. H.
Phila. & Boston Face Brick

Masons' Stoves
Drouve, G. Co.

Metal Covering
Chicago Metal Covering Co.

Mill Work
Schaller-Hoerr Co.

Mineral Wool
Columbia Mineral Wool Co.
U. S. Mineral Wool Co.

Miter Boxes
Goodell Mfg. Co.
Nicholls Mfg. Co.

Miter Machines
Fox Machine Co.

Miters
Fox, P. L.

Moldings
American Column Co.
Grand Rapids Wood Carving Co.
Schaller-Hoerr Co.
Waddell Mfg. Co.

Moldings, Wood, Metal Covered
Chicago Metal Covering Co.

Mortar Colors
French, Sam'l H. & Co.

Mortisers, Hand
Miller, Albert W., Mfg. Co.

Oil Filters
Burt Mfg. Co.

Ornamental Sheet Metal Work
Mullins, W. H. Co.

Ornamental Wire, Iron, Steel and Brass Work
Meyers, F. J. Mfg. Co.

Paint
New Jersey Zinc Co.
Standard Paint Co.

Parquette Flooring
Interior Hardwood Co.
Wood-Mosaic Flooring Co.

Patent Lawyers
Hamlin, George R.

Pencils
Dixon, Jos. Crucible Co.

Planes
Gage Tool Co.
Smith, Otis A.
Tower & Lyon Co.
Union Mfg. Co.

Plasterers' Corner Plates
New York Steel Corner Plate. Co.

Plastic Ornaments
French, Samuel H. & Co.

Plumbers' supplies
Karol, B. C.

Porch Columns
American Column Co.
Hartman Bros. Mfg. Co.

Post and Mining Machinery
Cement Machinery Co.

Reflectors
Frink, I. P.

Roofing, Art Metal Tile
Mullins, W. H. Co.

Roofing and Siding
Asphalt Ready Roofing Co.
Berger Mfg. Co.
Canton Steel Roofing Co.
Drouve, G. Co.
Eastern Granite Roofing Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Lincoln Waterproof Cloth Co.
National Roofing Co.
O. K. Harry Steel Works.
Scott & Co.
Standard Paint Co.
Stowell Mfg. Co.
Wheeling Corrugating Co.

Roofing Brackets
Stanley Rule & Level Co.

Roofing Paint
Asphalt Ready Roofing Co.
Dixon, Jos. Crucible Co.

Roofing Slate
Johnson, E. J. Co.

Sash Balances
Caldwell Mfg. Co.

Sash Chains
Bridgeport Chain Co.
Morton, Thomas.
Smith & Egge Mfg. Co.

Sash Cord
Samson Cordage Works.
Silver Lake Co.

Sash Holders, Automatic
Automatic Sash Holder Co.

Sash Locks
Ives, H. B. & Co.

Sash Operating Devices
Hitchings & Co.
Lord & Burnham Co.

Sash Pulleys
Grand Rapids Hardware Co.

Sashes, Doors and Blinds
Foster-Munger Co.
Lestershire Lumber & Box Co.

Saw Clamps
Disston, Henry & Sons.

Saw Filing Guide
Disston, Henry & Sons.

Saw Jointers
Crescent Machine Co.

Saw Sets
Taintor Mfg. Co.

Saw Tables
Chicago Machinery Exchange.
Crescent Machine Co.
Kidder, R. E.

Saws
Atkins, E. C. & Co.
Disston, Henry & Sons.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
National Saw Co.
Simonds Mfg. Co.

Schools
American School of Correspondence.
International Correspondence Schools.

Screw Drivers
Kraeuter & Co.
North Bros. Mfg. Co.

Sheet Metal Fronts
Mesker & Bro.

Shingles and Tiles, Metallic
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Cortright Metal Roofing Co.
Montross Metal Shingle Co.
National Sheet Metal Roofing Co.
Willis Mfg. Co.

Shingles Hip
Wheeling Corrugating Co.

Shingle Stains
Cabot, Samuel.

Shutter Worker
Mallory Mfg. Co.

Shutters (See Blinds)

Skylights
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Drouve, G. Co.
Edwards Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mullins, W. H. Co.
Willis Mfg. Co.

Speaking Tubes
Ostrander, W. R. & Co.

Spring Hinges
Bommer Bros.

Squares
Fox, P. L.
Nicholls Mfg. Co.

Squares, Combination
Hight, A. W., Toledo, O.

Steel Figures and Letters
Sackman, F. A.

Stoves and Ranges
Boynton Furnace Co.

Structural Iron and Steel Works
Boston Bolt Co.

Structural Slate
Johnson, E. J. Co.

Tanks, Steel
O. K. Harry Steel Works

Telephones
New York Telephone Co.

Tiling
Ostendorf, W. H.
Star Encaustic Tile Co.

Tool Boxes
Walter's Sons, W. P.

Tool Cabinets
Hammacher, Schlemmer & Co.

Tool Chests
Jennings, C. E. Co.

Tools
Forest City Bit & Tool Co.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
Kraeuter & Co.
Millers Falls Co.
North Bros. Mfg. Co.
Progressive Mfg. Co.
Reed & Auerbacher Co.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S., Co.
Strelinger, C. A., Co.
Tower & Lyon Co.
Walter's Sons, Wm. P.
Wilkinson, A. J., & Co.

Turned, Molded Carved Work
Waddell Mfg. Co.

Ventilating Attachment
Drouve, G., Co.

Ventilators
Burt Mfg. Co.
Globe Ventilator Co.

Veranda Stock
American Column Co.

Vises
Hammacher, Schlemmer & Co.

Wagon Jacks
Batavia Clamp Co.

Wall Ties, Wire
C. A. Mfg. Co.

Weather Strips
Hammacher, Schlemmer & Co.
King Mfg. Co.

Weather Vanes
Broad Gauge Iron Stall Works.

Window Apparatus
Drouve, G. Co.

Window and Door Stops
King Mfg. Co.

Window Fasteners
Stanley Works.

Window Stop Adjusters
Ives, Hobart B., & Co.

Window Trimmings
Caldwell Mfg. Co.

Windows, Fireproof
Mullins, W. H. Co.

Wire Wall Ties
C. A. Mfg. Co.

Wood Carving
Grand Rapids Wood Carving Co.

Wood Mantels
(See Mantels)

Wood Ornaments
Waddell Mfg. Co.

Wood Trimmers
Fox Machine Co.

Wood Working
Lestershire Lumber & Box Co.

Wood Working Machinery
American Wood Working Mach'y Co.
Barnes, W. F. & John.
Barnes Tool Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Cordesman-Rectin Co.
Fay, J. A. & Egan Co.
Fox Machine Co.
Kidder, R. E.
Long Island Machinery Co.
Marston, J. M. & Co.
Parks Ball Bearing Machinery Co.
Seneca Falls Mfg. Co.

Wood Working Machinery, Second Hand
Long Island Machinery Co.

FACTS AND FIGURES

A Simple Problem in Arithmetic

A SOLUTION WHICH IS OF INTEREST TO YOU

The Old Way

One man will scrape, by hand, about two squares, or two hundred square feet of flooring, in eight hours. The wage scale for this is from 40 cents to 55 cents per hour, or from $3.20 to $4.40 for 200 square feet, which is $1.60 to $2.20 per square.

The "Little Giant" Floor Scraper

FOR OAK
MAPLE
BIRCH
BEECH
YELLOW PINE
PARQUET
} Floors

Scrapes every inch of floor, into corners and along baseboard

The New Way

One man with a "LITTLE GIANT" FLOOR SCRAPER will scrape eight squares, or 800 square feet of flooring, in eight hours, which at the wage scale of from 40 cents to 55 cents per hour, would be 40 cents to 55 cents per square.

PAYS FOR ITSELF IN A FEW DAYS

SAVING

A saving is therefore made of from $1.20 to $1.65 per square.

On 5,000 square feet (50 squares), the saving will be from $60.00 to $82.50, which at the lowest wage scale, practically pays for the machine.

We furnish one dozen knives with each machine, and they will scrape 30,000 square feet of flooring.

New knives cost $6.00 per dozen.

SOLD UNDER OUR GUARANTEE TO DO BETTER, FASTER AND CHEAPER WORK THAN ANY OTHER METHOD

Price Complete . . $65.00
F. O. B. Chicago or New York

MANUFACTURED BY THE

HURLEY MACHINE COMPANY

General Offices and Works:
153-159 SOUTH JEFFERSON STREET
CHICAGO, U. S. A.
New York Office: 1010 FLAT IRON BUILDING

No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw

(Almost a Complete Workshop in One Machine.)

THIS Machine is suitable for various kinds of work—ripping (up to 3½" thick), cross-cutting, mitering, rabbetting, grooving, dadoing, etc., and with the additions of extra attachments, boring, scroll-sawing, edge moulding, beading, etc. The heaviest, most substantial, accurate and easiest running machine of its kind on the market.

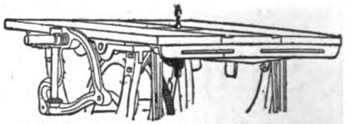
ADVANTAGES: Large adjustable combination wood and iron table, 28 x 36"; folding extension rolls for long work; two hand powers, one for self-feed ripping and the other for cross-cutting, etc., arranged at rear of machine, leaving table free and allowing operator a natural, upright and easy position; our patent foot-power with walking motion; three changes of speed, three changes of feed, no lost motion, power being transmitted entirely by chain belt and accurate machine cut gears, steel shafts and babbitt metal lined boxes, adjustable for wear; easy and quick to change machine from one operation to another.

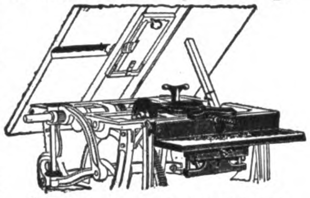
WE BUILD a complete line of Foot, Hand and Light Power Wood Working Machinery, and guarantee each machine to be thoroughly practical and accurate.

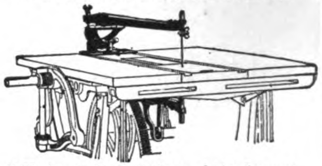
Machines sent on trial and if not found entirely satisfactory may be returned at our expense.

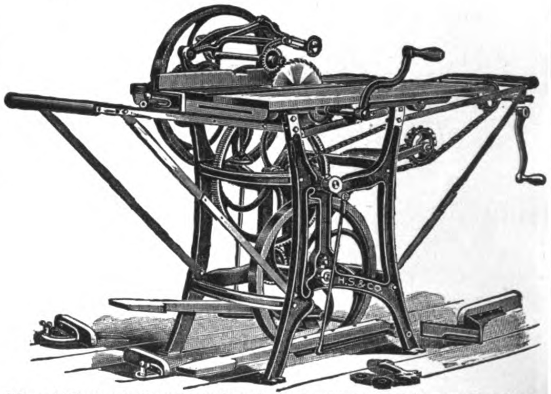
Send for Catalog A.

The Seneca Falls Mfg. Co.
209 Water St.,
SENECA FALLS, N. Y., U.S.A. 91-H.

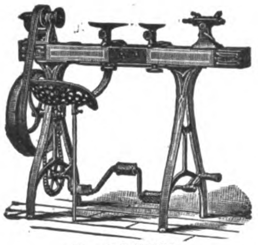

"Union" Moulding Attachment.


"Union" Boring Attachment.


"Union" Scroll Saw Attachment.


No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw.

HAND POWER FOOT
WOOD=WORKING MACHINERY.


No. 3 LATHE.

A Complete Line for a Carpenter and Builder.


Tenoner.

Our Machines are so constructed that you can take them to the house you are building.

. . . Saves Time.


No. 2 SCROLL SAW.


No. 7 SCROLL SAW.

Any of our machines will pay for themselves in a year and often in a single job.

Why buy these Machines? BECAUSE

You can save a mill man's profit.
You can make more money with less capital invested.
You can manufacture in as good style and finish, and at lower cost than the mill.
You can work up stuff ahead in winter for the spring rush in building.
10,000 builders are using from one to eight of our different machines.

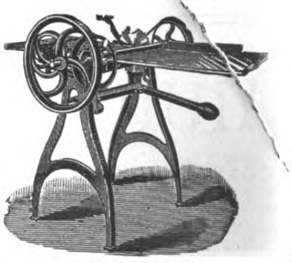
Our machines are not complicated, but simple, strong, practical and built for good hard work.


FORMER.

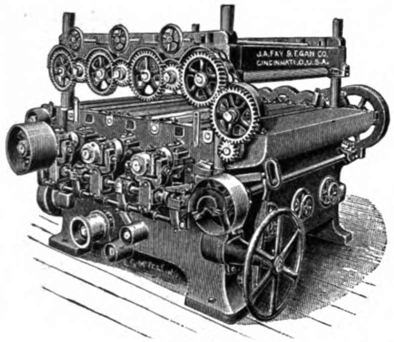

No. 4 SAW.


MORTISER

Send for Catalogue and Prices.


HAND RIPSAW.

W. F. & JOHN BARNES CO., 71 RUBY ST. ROCKFORD, ILL.



The "CONQUEROR" Triple Drum Sander

THIS machine finishes material from 30 to 80 inches wide and up to 8 inches thick, ready for paint or varnish and without any snake lines or marks. The three drums have an oscillating movement and any workman can remove and recover them easily, quickly and perfectly. Wherever the finest work is required in the quickest and most economical manner, this machine soon proves its worth. Sander Book giving all details and testimonial letters is sent free on request.

Ask for Circulars and Catalog also.

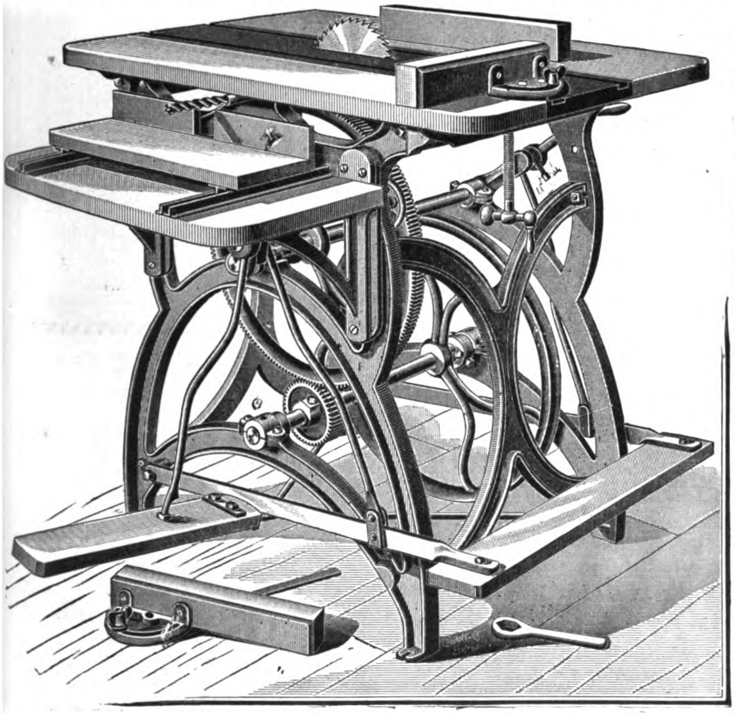
221-241 W. Front St.

Cincinnati, Ohio, U.S.A.

J.A.FAY & EGAN CO.

The World's Standard for Woodworking Machinery.

Marston's Hand and Foot Power Circular Saw.



Iron frame, 36 inches high.
Center part of top is made of iron accurately planed, with grooves on each side of saw for gauges to slide in.
Steel shafts and best babbitt metal boxes.
Gears are all machine-cut from solid iron.

Boring table and side treadle.
Two 7-inch saws and two crank handles with each machine.
Weight complete, 350 pounds.
Send for catalogue.

J. M. MARSTON & CO., 201 Ruggles St., Boston, Mass.

VANDORN IRON WORKS CO
CLEVELAND, OHIO.
STRUCTURAL STEEL & ORNAMENTAL IRON WORK.
JAIL WORK, JOIST HANGERS, IRON FENCINGS.

SECOND-HAND WOOD WORKING MACHINERY

Woods Moulder 12 in. Matchers 24 in.
Berlin Moulder 15 in. Pony Planers 16, 20, 24 in.
Rogers Moulder 8 in.

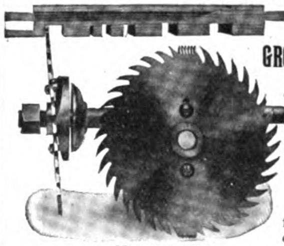
Variety Machines, Double and Single, Jointers, Swing Saws, Rolling Top Saw Tables, Gas and Gasoline Engines, Band Saws, Routers, Sanders, Circular Saws, Jig Saws.

A1 CONDITION. PROMPT DELIVERY.

All Kinds of Machinery Purchased for Cash.

LONG ISLAND MACHINERY CO.
15 Washington Ave., Brooklyn, N. Y.

GROOVER



One of the valuable tools that go with Wood-Work ing Machinery.

Manufactured by
Parks Ball Bearing Machine Co.
Sta. A., CINCINNATI, OHIO.

MARK YOUR TOOLS WITH A STEEL STAMP.

F. A. SACKMANN.
61 PROSPECT ST.
CLEVELAND, OHIO.
SEND FOR PRICE-LIST No. 7

Harry's Patent Adjustable Steel Drop Awnings.

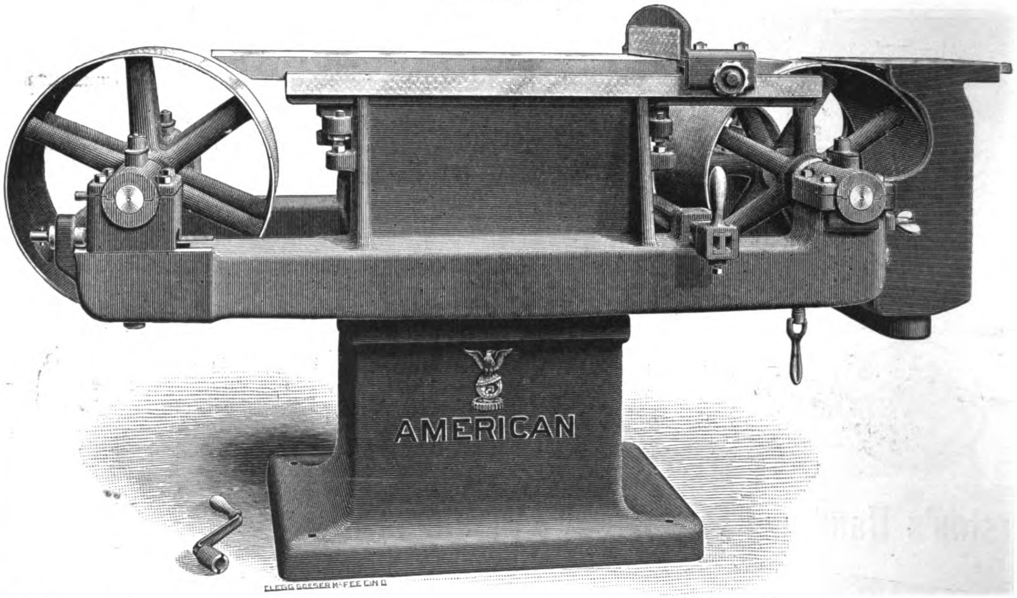
Harry's Underground Corrugated Galvanized Steel Cisterns and Tanks

Roofing of all kinds, Fencing, etc
Send for catalogue, prices, etc.

O.K. Harry Steel Works, 2341 Papin St., St. Louis, Mo

American 14" Sand Belt Machine

Specially adapted for sanding drawers, boxes, flat surfaces, rounding corners or any irregular or framed work.



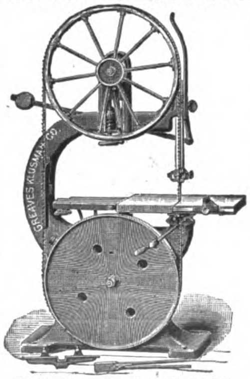
AMERICAN WOOD WORKING MACHINERY COMPANY

New Orleans, Chicago, New York

WOOD WORKING MACHINERY

FOR

Carpenters and Builders

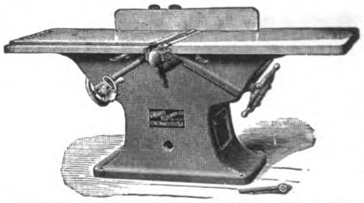


NEW PATENT 36-INCH BAND SAWING MACHINE.

Don't fail to visit our exhibit when in Chicago. Machinery of all descriptions for your inspection.

UP TO DATE MACHINERY
For the Progressive Carpenter

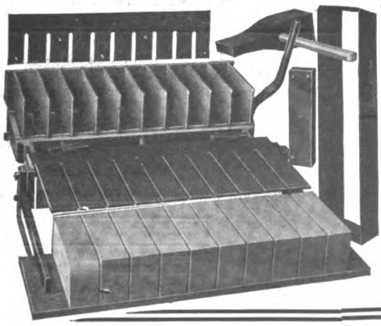
Write for prices on rebuilt MACHINERY



IMPROVED HAND PLANER AND JOINTER.

Tables over 7 feet long and have steel lips.
Cylinder Slotted to receive moulding bits and other irregular knives.
Cylinder has three Bearings, one of which is outside of pulley.

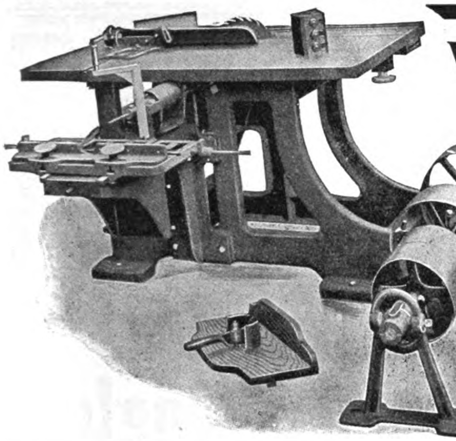
CHICAGO MACHINERY EXCHANGE, 13-15 No. Canal St., CHICAGO, ILL.



The Peerless Cement Brick Machine

A Simple One Man Machine made of Iron and Steel. Producing 10 perfect face or common brick at a time. Capacity, 3000 or more per day. Price Right. Send for Catalogue.

Peerless Brick Machine Co.,
10 Sixth St. North, Minneapolis, Minn.



VARIETY WOOD WORKER

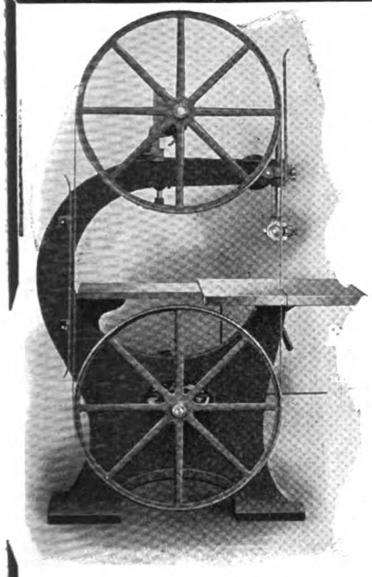
An Indispensable Tool for General Purposes

An ideal tool for contractors and builders, planing mills, pattern and specialty shops. Large shops having a special machine for most every purpose find this a splendid emergency tool to assist in the "rush of business." Small shops with limited room and power find this a handy and profitable tool.

Glue jointing, chamfering, planing out of wind up to 6 in. wide, straight or bevel, ripping, right angle or mitre cross cutting, boring, etc., can be perfectly done on this machine with usual fixtures that accompany it. Its range in general work is almost limitless in capable hands.

Ask for Large Circular and Full Particulars.

THE CORDESMAN=RECHTIN CO.,
DEPARTMENT "L"
CINCINNATI, : : OHIO



The Rigid Construction and Modern Design of the New 36=inch CRESCENT BAND SAW insure a machine of the very highest efficiency as a rapid producer of accu=rate work.

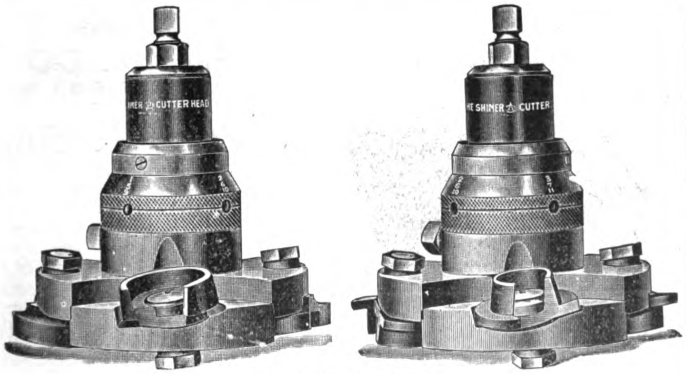
CRESCENT machines cost less than others of equal merit.

They are best because they are strong, durable and practical.

They are low in price because they are in big demand and we have to build them in large quantities.

Send at once for catalogue describing our complete line of BAND SAWS, SAW TABLES and JOINTERS.

THE CRESCENT MACHINE COMPANY, 206 Main Street, Leetonia, Ohio, U.S.A.



Best of All, Fig. 202 and Fig. 203.

The Shimer Cutter Head

For Flooring, Ceiling, Siding, Ship Lap, Jointing, Double Ceiling, Doors, Sashes, Blinds, Etc. Special Tools for Special Service.

Should appeal to every user of a matching, moulding or tenoning machine because it does more and better work than any others and requires less labor and expense to keep it in order. We make it of every size and style to fit any machine and send on trial thirty days to responsible lumbermen.

Send for our Catalogue and Pattern Book. It gives illustrations and complete description of a number of these tools, some of which will be of advantage to you.

SAMUEL J. SHIMER & SONS, MILTON, PENNSYLVANIA

Better Earnings for Carpenters

There is no reason or excuse for any carpenter or building tradesman to think he has reached the limit of his ability—that he cannot earn more money. Legitimate salaries to specially trained men run into large figures, and there will never be a time when you cannot earn more *if you make yourself worth more.* Every man versed in the affairs of the day knows that there is an enormous demand for specially trained men. It merely remains with you to secure this special training to command a responsible position and a large salary.

If an institution indorsed by the highest educational authorities, by United States Government officials, and probably by your own employers—an institution that stands ready to show you the names and addresses of 100,000 men and women whom it has directly benefited by bettering their positions and increasing their earnings—should offer to tell **YOU** how to better your position, increase your earnings, and make your life happier and more prosperous, and suit all the arrangements to your own particular circumstances and condition of life, wouldn't it be worth your while to investigate the offer?

The famous INTERNATIONAL CORRESPONDENCE SCHOOLS is this Institution, and it now offers to tell you all this if you will simply mark and mail the coupon below. It puts you under no obligation whatever to do this. *Isn't your future worth this much?*

INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 969, Scranton, Pa.

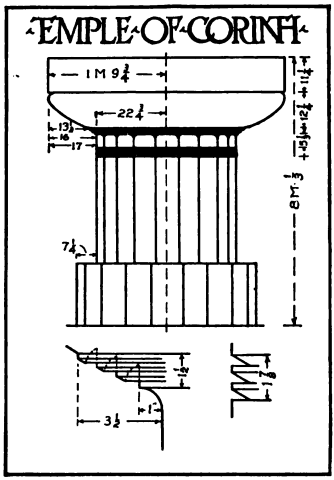
Please explain, without further obligation on my part, how I can qualify for a larger salary in the position before which I have marked **X**.

Architect
Architectural Drafts.
Building Inspector
Contractor & Builder
Structural Engineer
Mechanical Engineer
Mechanical Drafts.
Machine Designer
Electrical Engineer
Municipal Engineer
Heat. and Vent. Eng.
Chemist
Sheet-Metal Drafts.
Sanitary Engineer
Foreman Plumber
Electrician
Steam Engineer
Marine Engineer
Surveyor
Textile Expert
Bookkeeper
Stenographer
Ad Writer
French, German, Spanish } With Edison Phonograph

Name ____________________

St. & No. ____________________

City ____________ *State* ____________



A New Work

for

CARPENTERS and BUILDERS

The Newest and most Comprehensive Treatise on the Greek and Roman Orders published. "The Five Orders of Architecture."

Entirely New—Not a Revision

A new work, invaluable to draftsmen and architects; also to carpenters and contractors who desire to learn how to proportion columns, cornices, gables, balustrades and other details in the various styles of architecture, such as Doric, Ionic, Corinthian, etc. If you are drawing plans for houses, you will find the plates invaluable for designing exterior and interior finish.

The work consists of one large volume of text, 442 pages, 7 x 10 inches, handsomely and substantially bound in half red morocco leather, and a handsome portfolio of 58 working plates, 11 x 15 inches, carefully drawn to scale and printed on heavy plate paper, convenient for reference. The text is illustrated with more than 300 valuable drawings, of cornices, columns, elevations, plans, sections of mouldings, ornaments, etc., all drawn to scale with dimensions, and in addition a large number of full page photographs of the best examples of actual buildings. It also contains a comprehensive Glossary or list of architectural terms, together with the pronunciation and definition,—and a valuable Bibliography or list, of best books relating to architecture.

FOR EXAMINATION

Free! These books are compiled from our best instruction papers. The regular price is $15.00, but to acquaint the readers of Carpentry and Building of the value of our instruction in architecture, we will for a limited time reduce the price to $12.00 and send the books on the following terms:

OUR SPECIAL OFFER

We will send the books without a payment by prepaid express on five days' approval. If satisfactory, send $2.00 and $2.00 per month for five months until the special introductory price is paid (if you prefer to pay cash in advance, send $10.80); otherwise, notify us and we will send for the books.

American School of Correspondence,

CHICAGO, - - U. S. A.

COUPON.—Cut Out and Mail To-day.

AMERICAN SCHOOL OF CORRESPONDENCE,
Chicago, Ill.

Please send me on five days' approval, express prepaid, one set Five Orders of Architecture. If satisfactory I agree to pay $2.00 down and $2.00 per month for five months, otherwise I will notify you to transfer the books free. Cash with order $10.80 Money refunded if not satisfactory.

Name ....

Street and No. ....

City .... State ....

Carp. & Bldg., Sec

"AMERICAN"

Polygon Conductor Pipe

Can be furnished in either Galvanized Iron or Copper.
It is made from galvanized iron in 10-ft. lengths,
without a cross seam; from copper in 8-ft. lengths.

American Rolling Mill Co., MIDDLETOWN, OHIO.

ARCHITECTS! CONTRACTORS! BUILDERS!

When you want any STRUCTURAL WORK it will pay you to write to the

BOSTON BOLT COMPANY
ESTABLISHED 1872

Works, Offices and Salesroom
38-54 Farnsworth Street

Convertors of Iron and Steel into Bolts, Expansion Bolts, Nuts, and all kinds of Structural Work for Mills, Churches, Halls, Factories, Bridges, Wharves, Etc., and Iron Work of all kinds forged and made to order. *Send for catalog.*

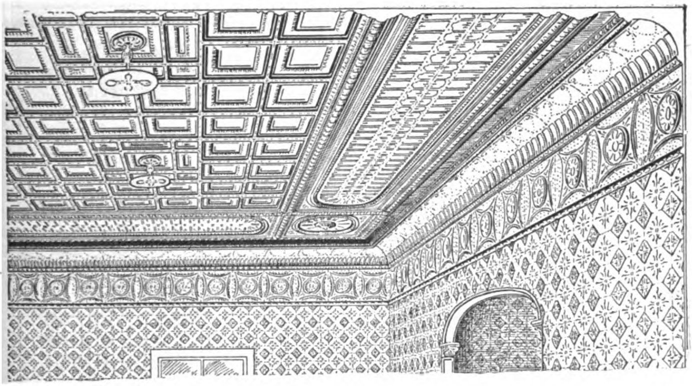
JOHN W. CROOKS, Treasurer
BOSTON, MASS.

To Make Money From Your Invention

it must be protected by such a PATENT as will enable you to completely MONOPOLIZE it and control infringers. I procure patents that stand the test of competition at a cost probably nowhere near as high as you may think. The patent law favors the DILIGENT, not the indolent, inventor, so send me TO-DAY a sketch or model, and explanation of your invention and I will furnish full advice. To morrow, next week, or next month may be too late. References on request.

GEO. R. HAMLIN, Patent Lawyer, 800 H Street, N. W., Washington, D. C.

CORRUGATED IRON Painted and Galvanized. } **SCOTT & CO.,** Cincinnati, O. Agents Wanted } **IRON ROOFING** Painted and Galvanized.



THE KINNEAR

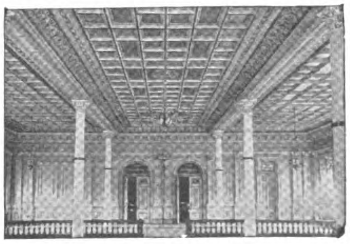
LOCK-JOINT STEEL CEILING, Etc.

Has no equal. Try it and be convinced. Prices reasonable.
Catalog upon request. Send measurements for estimate.

The Kinnear & Gager Co., M'f'r's, COLUMBUS, OHIO
BOSTON, 125 Broad St

We make Ceilings for churches, schools, stores, lodge rooms, court rooms, libraries, residences, etc.

Our ceilings are shipped ready for erection. No expert labor required. Working drawings furnished. They're adapted to any kind of building. Exclusive in classified design.



Berger "CLASSIK"
Steel Ceilings

We also make Steel Roofing, Siding, Metal Shingles, Architectural Sheet Metal Work and Fireproofing Material.

Our catalogues sent you free. Ask for them.

THE BERGER MFG. CO.
CANTON, OHIO.
New York. Boston. Phila. St. Louis

COPPER
LIGHTNING RODS

ABSOLUTE PROTECTION from LIGHTNING is given by use of our continuous copper conductors.
E. G. Washburne & Co., 46 Cortlandt St., New York.
Telephone 3125 Cortlandt.
Work put up or material furnished.

THE IMPROVED
Hand and Foot Power **E. F. B.**
SAWING MACHINE.

For Carpenters, Builders and All Wood Workers Who Have Shops Without Power.
SEND FOR CIRCULAR.
THE BARNES TOOL CO., New Haven Conn.

Diamond Expansion Bolt.

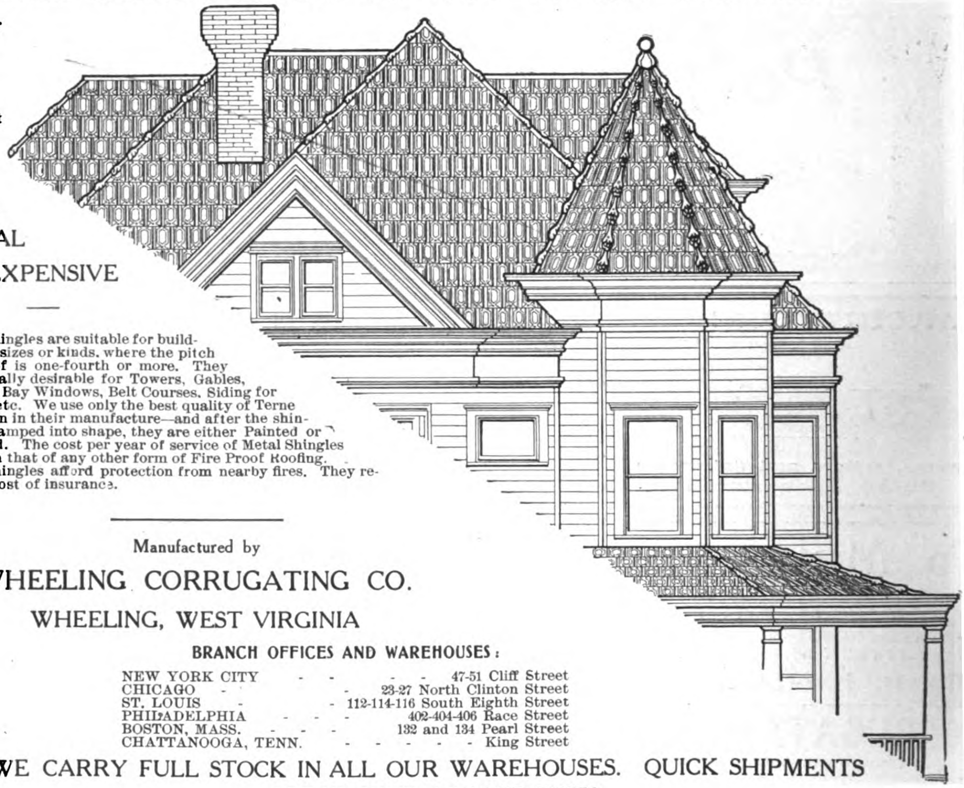
Patented.
For fastening fixtures, timbers, etc., to brick, stone concrete or other masonry.
DIAMONDEXPANSION BOLT CO.,
9-11-13-15 Murray Street, New York, N. Y

Estimating!

Estimating the cost of a job safely and correctly is the most vital element of success to the contractor. Therefore he should have a copy of ***The Lightning Estimator*** for residence work, etc. Illustrated. Covers the entire field for the mason and carpenter, teaching a new practical, reliable method, showing the exact cost of each separate item of the labor and material, but so arranged that a medium priced house may be estimated in 30 to 60 minutes. For the busy builder. Is having the most phenomenal sale and splendid endorsement of any book of its kind ever put upon the market. In a class by itself. Prepared by a builder of experience from actual building construction, not theory. Large sales permit us to sell the book for 60 cents. (Money order.) You cannot afford to wait. Write now.

BRADT PUB. CO.,
260 Michigan Avenue, JACKSON, MICH.

DIXIE METAL SHINGLES—SO—EASY—TO—LAY—FIRE PROOF—



Weather Proof

A Perfect Lock

ORNAMENTAL

NOT EXPENSIVE

Metal Shingles are suitable for buildings of all sizes or kinds, where the pitch of the roof is one-fourth or more. They are especially desirable for Towers, Gables, Mansards, Bay Windows, Belt Courses, Siding for Cottages, etc. We use only the best quality of Terne Roofing Tin in their manufacture—and after the shingles are stamped into shape, they are either Painted or Galvanized. The cost per year of service of Metal Shingles is less than that of any other form of Fire Proof Roofing.

Metal Shingles afford protection from nearby fires. They reduce the cost of insurance.

Manufactured by

WHEELING CORRUGATING CO.

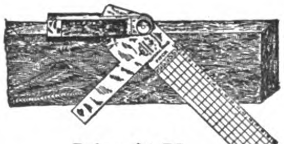
WHEELING, WEST VIRGINIA

BRANCH OFFICES AND WAREHOUSES:

NEW YORK CITY	47-51 Cliff Street
CHICAGO	23-27 North Clinton Street
ST. LOUIS	112-114-116 South Eighth Street
PHILADELPHIA	402-404-406 Race Street
BOSTON, MASS.	132 and 134 Pearl Street
CHATTANOOGA, TENN.	King Street

WE CARRY FULL STOCK IN ALL OUR WAREHOUSES. QUICK SHIPMENTS

LET US QUOTE YOU OUR PRICES



Price, $1.75

TOPP'S FRAMING TOOL.

A PERFECT TOOL and the only Tool for the purpose ever invented.

Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

Write for booklet. Address the manufacturers,

G. A. TOPP & CO., - Indianapolis, Ind.

SECURE
PROTECTION AND LONG
SERVICE BY USING OUR
ASPHALT ROOFING
SAVES REPAIRS
SAVES RECOATING
SAVES RENEWING
Send for Samples and Pamphlet
STOWELL MFG. CO.
JERSEY CITY, N.J.

Its application is very simple— no experienced help is needed. With every roll are included nails, tin caps and cement sufficient for the work. RUBEROID is so pliable that it fits anywhere.

THE well-told truth has for 13 years drawn builders' attention to RUBEROID ROOFING—demonstration of this truth has made its believers legion. RUBEROID ROOFING does all claimed for it. It *is* water and weather-proof. Its resistance to acids, gases, great heat and even fire is extraordinary. It will *not* melt, rot or crack. But "above all things" avoid imitations. Look for the registered trade mark "RUBEROID" always stamped on the under side. Send for samples.

MANUFACTURED SOLELY BY
THE STANDARD PAINT CO.,
100 William St., New York.
CHICAGO OFFICES: 188-90 Madison St.

Digitized by Google

Original from UNIVERSITY OF MICHIGAN

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

We Give Particular Attention To Special Designs

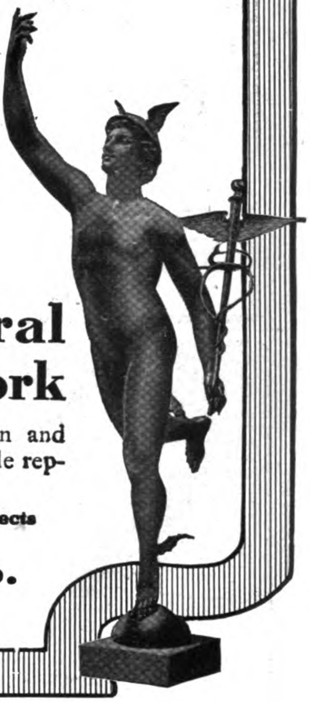
and are fully equipped to execute the most intricate and delicate work ever attempted in sheet metal.

Mullins
Art Architectural Sheet Metal Work

is far in advance in architectural design and artistic execution and has won an enviable reputation for excellence.

Estimates, Designs, etc., submitted to architects builders and contractors on request.

The W. H. Mullins Co.
208 Franklin St., Salem, Ohio.
(Everything in sheet metal.)



STEEL CEILINGS

Do you know the advantage of having a ceiling dust proof and air-tight?
It's an advantage which is appreciated and approved by the United States Government Engineers. Pretty strong endorsement, isn't it?
May we send you Catalogue "F"?

S. Keighley Metal Ceiling & Mfg. Co.
PITTSBURGH, PA.
Baltimore Washington
New York Boston

LOCK-JOINT
DUST-PROOF
ECONOMICAL
EASY TO ERECT

TOP IT OFF

With our

No. 76 Cresting

and be proud of your roof finish. Send for catalog No. 5 showing a very complete line of architectural metal work.

STEEL CEILING is a leading feature with us.

We make the W. H. Miller Patent Metal Window Frames and Sash. Special catalog on these. Originators of the hip shingles.

WILLIS MFG. CO., - - Galesburg, Ill.

BOOKS.

YOU CAN OBTAIN PROMPT ADVICE regarding the books on any subject in which you are interested by addressing DAVID WILLIAMS COMPANY, Publishers and Booksellers, 14-16 Park Place., N. Y.

CORTRIGHT

METAL SHINGLES

A Clean Profit Without Any Investment

That's what the Cortright proposition is.
Thousands of carpenters are taking advantage of it.
Making money, and making it easily.
If you want to know more about it, write

Cortright Metal Roofing Co.
Philadelphia and Chicago.

"STAR ENCAUSTIC TILE CO.,"

MANUFACTURERS OF

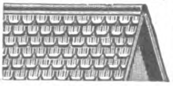
Superior Unglazed Encaustic Tile

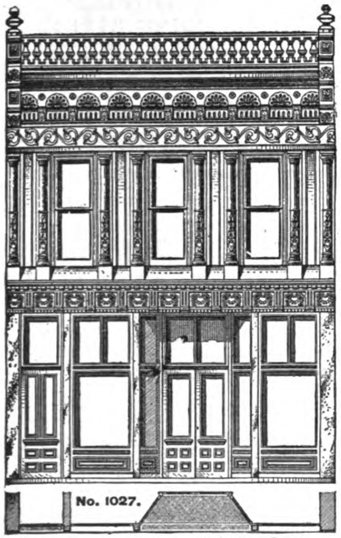
For Floors in Stores, Churches, Depots, Kitchens, Halls, Porches, &c.

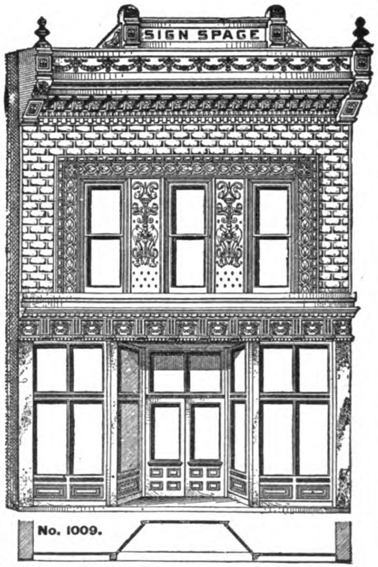
Office and Factory, Bluff Street, near Gist,
PITTSBURG PA.


Ellers
Metal
Stove pipe iron.
Cornice.
Skylights.
Eavestrough.
Conductor pipe.
Steel roofing & siding. Solder etc.
Tin plate
Ceilings
The Eller Mfg. Co successor to J.H. Eller & Co
Canton, Ohio.


For More Light on the Subject send for our PHOTO-PAMPHLET
PERFECTED GRANITE ROOFING







25 feet wide—lower ceiling 12 feet in clear.

Net price F. O. B.		St. Louis, Mo.	$209.00
“	“	New York, N. Y.	238.00
“	“	St. Paul, Minn.	229.00
“	“	Denver, Colo.	268.00
“	“	Dallas, Tex.	253.00

Net price F. O. B.		St. Louis, Mo.	$187.00
“	“	New York, N. Y.	212.00
“	“	St. Paul, Minn.	204.00
“	“	Denver, Colo.	239.00
“	“	Dallas, Tex.	225.00

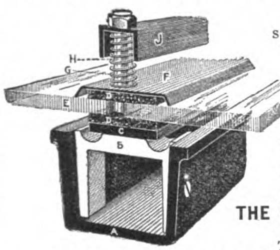
Galvanized Sheet Steel Fronts

The designs presented herewith illustrate our complete and modern store fronts. The prices include the steel sill course, steel vestibule plate, steel angle columns for covering end walls, steel intermediate box columns; show sash, store doors, transoms, door posts, box window frames with sash of white pine 1¾ in. thick; all glass for same of double strength; galvanized iron work above first-story columns.

We make and ship over 800 fronts annually from 20 to 300 feet in width and from one to five stories high. Having given the manufacture of complete fronts our most careful study for over thirty years, they are now the best, cheapest and most elaborate in the market. Owing to their simple and practical construction, any mechanic, whether experienced in this particular line or not, can erect them, aided by a set of full-size details and instructions that we furnish. We desire to introduce this class of work in every city in the United States, and solicit the correspondence of architects, builders and others contemplating the erection of buildings. Send for references, full descriptive catalogue and discounts. **Established 1846.**

MESKER & BROTHER,
421-519 S. SIXTH STREET - - - ST. LOUIS, MO. U. S. A.

THE "ANTI-PLUVIUS" SKYLIGHT



Absolutely and permanently impervious to rain, snow, sleet or dust without putty or cement. With bridge arrangement for walking on the skylight without danger of breaking the glass. Specially adapted for large buildings and shops where there is always more or less vibration.

A—Steel Supporting Bar.	F—Copper Sheet Cap.
B—Mall. Iron Bridge.	G—Coil Galv. Brass Spring.
C—Flat Iron.	H—Galv. Brass Stud.
D—Felt.	J—Bridge (for walking on skylight).
E—Glass.	

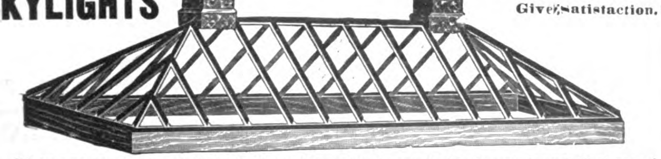
THE G. DROUVÉ CO., Bridgeport, Conn., U. S. A.

Also Manufacturers and Erectors of
THE LOVELL WINDOW OPERATING DEVICE.

Inquiries Solicited and Estimates Cheerfully Furnished.

SKYLIGHTS

Our Metal Skylights Give Satisfaction.



They are so constructed that all condensation is carried to the curb and discharged through weep holes on to the roof without soaking between laps.

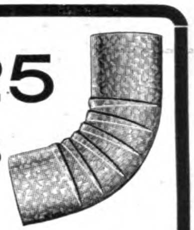
The peculiar construction of the curb on our skylights renders counterflashing unnecessary.

Frames of galvanized iron or copper, with glass of any kind or thickness.

Write for our New Cornice, Skylight and Ornament Catalog.

THE CANTON STEEL ROOFING CO., Canton, Ohio

1225
VARIETIES
of
Conductor Elbows



ARE MADE BY

F. Dieckmann
1182 Harrison Ave.
Cincinnati
O.

Reduced Rates
for
Telephone Service

throughout Greater New York are effective from July 1st. Contracts now being taken at new rates.

Call nearest Contract Office for full information.

NEW YORK TELEPHONE COMPANY

Contract Offices:	*Telephone No.:*
15 Dey Street	9010 Cortlandt
115 West 38th Street	9040-38th
220 West 124th Street	9000 Morningside
616 East 150th Street	9020 Melrose

DO YOU WANT THE BEST

DRAWING TABLE

made? If so send for illustrated catalogue and prices.

R. E. KIDDER,
22 Hermon Street, Worcester, Mass.

**BUY . . . .
LUMBER
DIRECT**

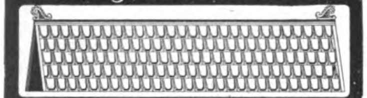
WE MANUFACTURE ALL KINDS.—MOULDINGS, WINDOWS, DOORS, BLINDS. MIXED CARS, INCLUDING EVERYTHING FOR A BUILDING. STRAIGHT CAR-LOADS SHINGLES, SIDING, FLOORING, WHITE PINE, AT WHOLESALE PRICE.

"Our complete Catalog and Price List of all kinds of Building Material would be a great help to you in figuring."

LESTERSHIRE LUMBER & BOX CO., LESTERSHIRE & BINGHAMTON, NEW YORK.

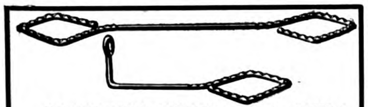
WALTERS'

Shingles that last



Made from Galvanized Tin and Painted Tin
STORM, RUST AND FIRE PROOF
Do you want to increase your business? THIS IS YOUR OPPORTUNITY. Write for catalogue, samples and prices.

National Sheet Metal Roofing Co.,
JERSEY CITY. N. J.



EXCELSIOR WIRE WALL TIES!
Galvanized steel wire. Strong and reliable. In use everywhere. Samples free. Order of your dealer. Agents Wanted. **C. A. Mfg. Co.,** La Salle, Illinois.

Selected Books For Carpenters

Hicks' Builders' Guide	$1.00
Meloy's Progressive Carpentry	1.00
Sylvester's Modern Carpentry and Building	1.50
Kidder's Building Construction and Superintendence, Volume 2—Carpenter's Work	4.00
Hodgson's Practical Uses of the Steel Square, Volumes 1 and 2, each	1.00
Hodgson's Modern Carpentry and Joinery	1.00
Shawver's Plank Frame Barn Construction	0.50
Stoddard's Steel Square Pocket Book	0.50
People's Pocket Stair Builder and Carpenter's Handbook	2.50
Maginnis' How to Measure Up Wood-Work for Buildings	0.50
Hodgson's Up-To-Date Hardwood Finisher	1.00
Maire's The Modern Wood Finisher	0.50
Easy Lessons in Roof Measurements	0.25
How to Become a Good Mechanic	0.25

Our Descriptive List of books for the Building Trades sent on request.

David Williams Company
14-16 Park Place, NEW YORK

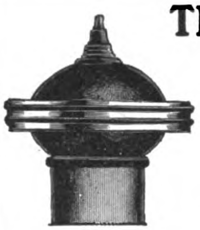
Dexter Portland Cement.

HIGHEST STANDARD ATTAINABLE FOR PAVEMENT AND CONCRETE WORK.

SAMUEL H. FRENCH & CO.,
Sole Agents,
PHILADELPHIA.

Established 1844.

THE "GLOBE" VENTILATOR



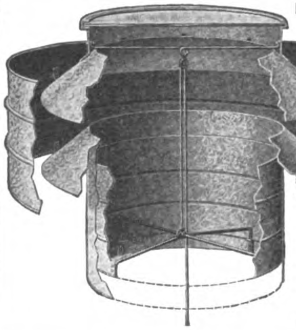
In Brass, Copper, Galvanized Iron and with Glass Tops for Skylight Purposes. Also

"Globe Ventilated Ridging"

For Barns, Residences and Buildings of every character. Far superior to a Cupola.

Send for Description and Price List.

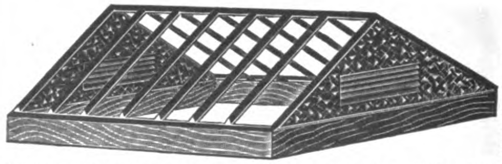
Manufactured by **GLOBE VENTILATOR CO.** Troy, N.Y.



THE "BURT" VENTILATOR is no experiment; has been on the market nearly 5 years; is used by the most prominent concerns in the Country. The "Burt" is the only Ventilator on the market with the sliding sleeve damper (patented). This damper is ideal where glass tops are used, as the ventilator can be closed, yet the skylight feature is never affected—always free and open. The temperature can be regulated better, damper never moves and never collects dust.

Before purchasing a ventilator of any make, send for our finely illustrated booklet describing in detail our claims for the "Burt" MADE IN ALL SIZES, BOTH GLASS AND METAL TOPS.

THE BURT MANUFACTURING CO.
231 Main Street, Akron, Ohio, U.S.A.
Largest Manufacturers of Oil Filters and Exhaust Heads in the World.



ART METAL CEILINGS

Exclusive and Artistic Designs appropriate for any style of architecture.

All Styles Galvanized and Copper Skylights, Cornices, Finials, Crestings, Ventilators, Metal Shingles, Roof Gutters, all styles painted and galvanized Iron Roofing and Siding, etc. Write for Catalogue and Prices. Estimates free.

Kanneberg Roofing & Ceiling Co.,
Manufacturers,
CANTON, OHIO.

THE NEW YORK STEEL CORNER PLATE CO.
—SUPPLY—
The Parker Steel Corner Bead for the Protection of Plastered Corners
Outlines a perfect corner. The best Corner Bead in the market. Fits any ground.
Endorsed by Leading Architects, Builders and Plasterers.
Telephone 876 Madison Square.
All communications to 1135 B'way, N. Y. C.

STORE ELEVATOR FOR $105

COMPLETE, READY TO ERECT, MADE BY THE HUNDRED. SIMPLE IN CONSTRUCTION. EASILY CARED FOR. OTHER STYLES AND PRICES TO SUIT.

The Warner Elevator Mfg. Co.
2100 Valley St., CINCINNATI, O.
NEW YORK OFFICE: 2032 PARK ROW BUILDING.

MORSE HAND ELEVATORS and DUMB WAITERS

Smooth Running Safe Durable

They are sold with or without lumber and we furnish all the necessary drawings and instructions for erecting. All details free. Write for them.

Morse, Williams & Company
PHILADELPHIA ATLANTA BOSTON

The New Book by F. E. Kidder

Strength of Beams, Floors and Roofs

is prepared especially for carpenters, draughtsmen and architects

WHO HAVE NOT HAD THE ADVANTAGE OF A TECHNICAL EDUCATION. : : :

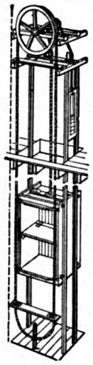
The rules given for the strength of beams and floors are very simple and practical, requiring for their application no higher knowledge than that of simple arithmetic.

The mechanical principles of the ordinary types of trusses are fully and clearly explained, and also the methods of computing the stresses and proportioning the members.

THE CHAPTER ON TRUSS JOINTS IS OF SPECIAL INTEREST : :

230 Pages TWO DOLLARS, PREPAID 164 Engravings

DAVID WILLIAMS COMPANY, Publishers
14-16 Park Place : : : · New York



DUMB WAITERS AND HAND ELEVATORS.

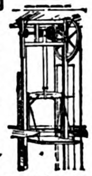
Trunk Lifts,
Invalid Lifts,
Carriage Elevators,
Freight Elevators,
Sidewalk Elevators,
Hatchway Hoists.

All of most improved design and construction.

Sedgwick Machine Wks.,
88 Carroll Street,
POUGHKEEPSIE, N. Y.
New York Salesroom, 128 Liberty St.

Catalogue on application.
Estimates on request.

Improved Quick and Easy Rising Steam, Electric and Hand Power Safety



ELEVATORS

AND DUMB WAITERS.
Automatic Hatch Gates.
Send for Circulars.

KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kimball Elevator Co., Cleveland, Ohio, 245 Vincent St
Branch Offices:
120 Cedar St., New York. 108 11th St., Omaha, Neb

ELEVATORS AND DUMBWAITERS

that can be placed in position by any carpenter.
Catalogue Free.

Energy Elevator Co.
407 Cherry St., - Phila., Pa.

ALL KINDS OF
ELEVATOR CARS AND ENCLOSURES

Bank and Office Railing.

Send for Catalog.

FRED J. MEYERS MFG. CO.
HAMILTON, OHIO

THE LEADING WORK ON MODERN BUILDING CONSTRUCTION IS

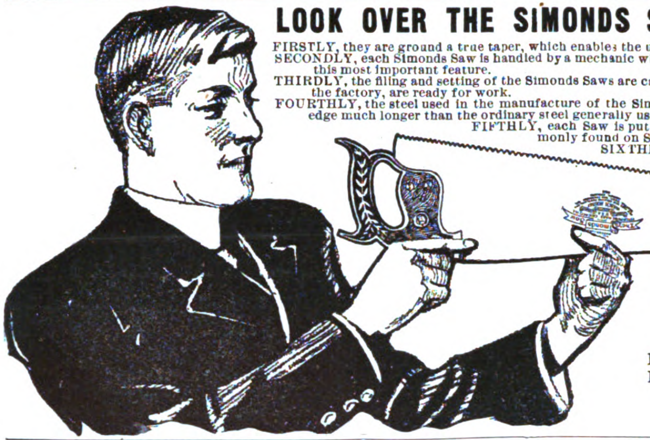
Kidder's Building Construction and Superintendence.

Vol. I., Masons' Work. - $4.00.
Vol. II., Carpenters' Work, $4.00.

Treats all operations in detail describing and illustrating how the parts of buildings should be put together.

SOLD SEPARATELY BY

DAVID WILLIAMS COMPANY,
14-16 Park Place. NEW YORK



LOOK OVER THE SIMONDS SAWS, and you will see the points of advantage.

FIRSTLY, they are ground a true taper, which enables the user to run the Saw with very little Set.

SECONDLY, each Simonds Saw is handled by a mechanic who thoroughly understands the hanging of the Saw, which guarantees this most important feature.

THIRDLY, the filing and setting of the Simonds Saws are carefully done, and thoroughly inspected, so that the Saws, on leaving the factory, are ready for work.

FOURTHLY, the steel used in the manufacture of the Simonds Saws is a high carbon crucible steel, and will hold its cutting edge much longer than the ordinary steel generally used.

FIFTHLY, each Saw is put up in a separate case, thus avoiding fingering and rust marks commonly found on Saws that are not encased properly.

SIXTHLY, because every Simonds Saw is guaranteed thoroughly.

Any mechanic trying a Simonds Saw, and not finding same satisfactory, may return the Saw, either to the dealer or to the Simonds Mfg Co., and get either a new Saw or money paid back.

SEND FOR CATALOGUE AND PRICE LIST.

SIMONDS MFG. CO.,

Fitchburg, Mass. Chicago, Ill. New York, N.Y.
Portland, Ore. Seattle, Wash.

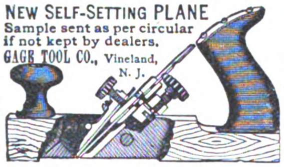
SIMONDS MFG. CO., Ltd., New Orleans, La.
SIMONDS SAW CO., San Francisco, Cal.

STANDARD MINERAL WOOL

LOOKING ALL WAYS FOR BUSINESS

COLUMBIA MINERAL WOOL CO.,
Room 918, 112 Clark St. CHICAGO.
Samples and Circulars Free

NEW SELF-SETTING PLANE
Sample sent as per circular if not kept by dealers.
GAGE TOOL CO., Vineland, N. J.



Irons warranted. Plane is returned money refunded.

WANTED

For different territories, Builders' Hardware Salesmen, to demonstrate to Architects and Builders, and to sell to Hardware Dealers, on commission, our new Automatic Sash Holder, which does away with weights, cords, and pulleys at great saving of money, and which will sell at sight. For further particulars we refer to cut and article in *The Iron Age* of June 21st

Address with reference, Automatic Sash Holder Co., 277 Broadway, New York.

Bolcoa
TRADE MARK
ETCHING FLUID

Will mark your tools in a manner impossible to erase, without destroying the article itself. Protect yourself against loss and theft. Easy of application. **Price 25 cents.** We handle a full line of tools. Let us know your wants.

Reed & Auerbacher Co.
229 Bowery, N. Y.

Fireplace Mantels
MADE OF
Ornamental Brick
$12 and up.

Last longest—look best—are not too costly. There's no other kind so good—so pleasing. Our Sketch Book tells all about them. Write for it.

PHILA. & BOSTON FACE BRICK CO. - P. O. Box 8613 - BOSTON, MASS.

OUR FINE HARDWOOD FLOORING
SHOULD BE THE BEST.

We have been making PARQUETRY for TWENTY YEARS. We have our own saw mill and timber tracts and two factories. Send for our trade discounts and our Design Book No. 5.

WOOD-MOSAIC FLOORING CO.
ROCHESTER, N. Y. NEW ALBANY, IND

A HOUSE
Lined with
Mineral Wool

As shown in these sections, is warm in winter, cool in summer, and is thoroughly deafened. The lining is vermin proof; neither rats, mice nor insects can make their way through or live in it. Mineral Wool checks the spread of fire and keeps out dampness.

Sample and Circular Free.

U. S. MINERAL WOOL CO.,
143 Liberty St., New York.

The Boynton Furnace Co.
SOLE MFRS. OF

Boynton's Furnaces,
Ranges,
Hot Water Heaters,
Steam Heaters, Etc.

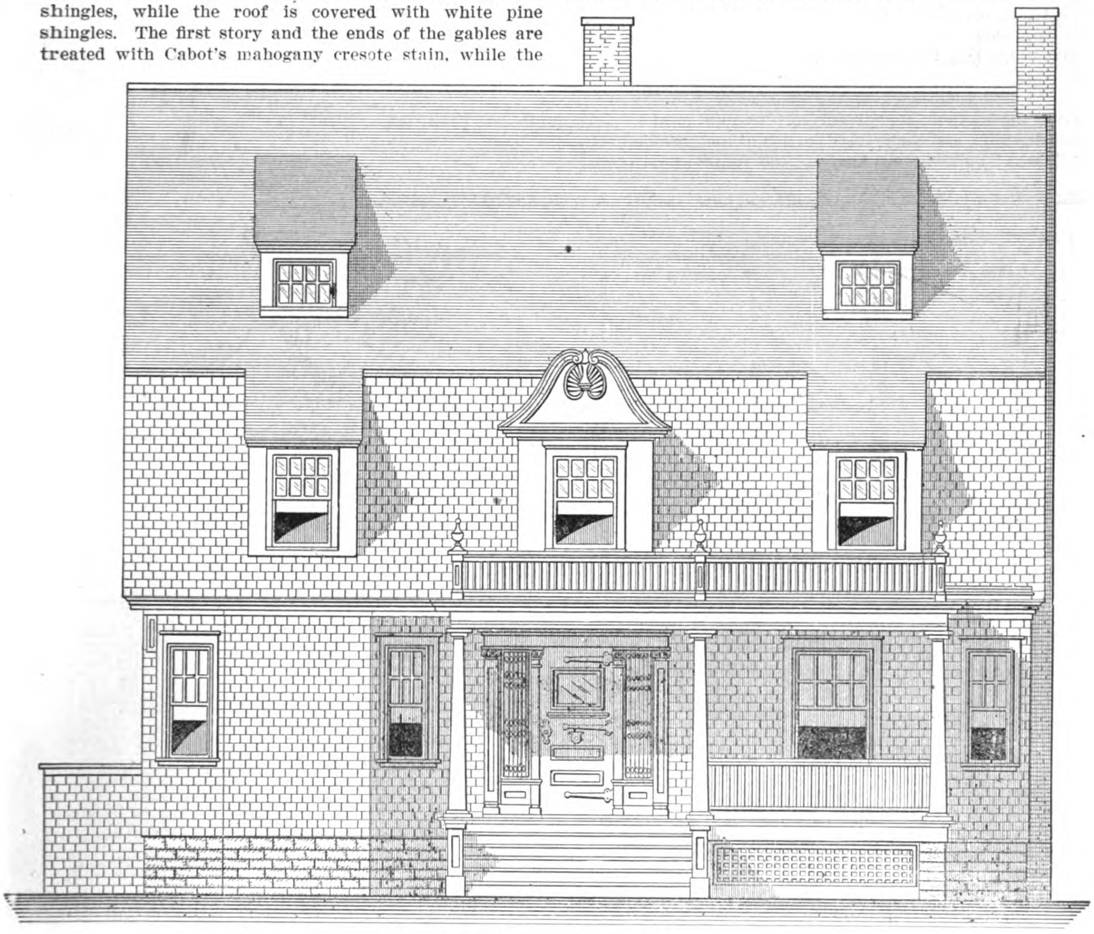
207-9 Water Street, New York.
147-9 Lake Street, Chicago.

EVERY Builder who reads, investigates and progresses will have a copy of Kidder's Strength of Beams, Floors and Roofs. $2.00 prepaid.
DAVID WILLIAMS CO. 14-16 Park Place, N. Y.

Carpentry and Building

NEW YORK, AUGUST, 1906.

Colonial Residence in Council Bluffs, Iowa.



Front Elevation.—Scale, ⅛ In. to the Foot.

Colonial Residence in Council Bluffs, Iowa.—J. C. & W. Woodward, Architects.

FOR a long time past there has been a decided revival of the Colonial style of architecture in connection with private dwellings which have been erected over the country, and the study which we present to the attention of our readers this month will be found an interesting example of this type of building. In the present instance the whole exterior is covered with dimension cut stained shingles, while the roof is covered with white pine shingles. The first story and the ends of the gables are treated with Cabot's mahogany cresote stain, while the remaining portions and the roof are treated with green shingle stain. The outside porch, as well as all casings, door and window frames, are painted white and the sash black, which contrasts with the stained shingles, the green trees, shrubs and grass, thus giving the artistic effect which tends to render this style of architecture so popular. The front entrance has bevel plate art glass windows each side, and the door itself is fitted with bevel plate glass.

The frame of the building is sheathed with shiplap, over which is a layer of paper, this in turn being covered with shingles as stated. The sills are 4 x 6 in., and the rafters and studding 2 x 4 in., placed 16 in. on centers. The cellar is 8 ft. in the clear, and has a cement floor.

An inspection of the plans shows upon the main floor a sitting or living room extending the entire depth of the house, a library, dining room and kitchen, while upon the second floor are three sleeping rooms and sewing room, with servants' room in the attic. Communication between the main hall and living room is established through an arched opening with two large columns resting on box bases. The living room is provided with a Boston and Philadelphia face brick mantel, beamed ceiling, art glass transoms each side of the mantel, and oak seats as indicated on the plans. In the dining room is an art glass window over the sideboard and a window each side of it. The finish of the principal rooms is in oil. Speaking tubes connect the kitchen and dining room with the hall and bedrooms on the second floor. The dumbwaiter and clothes chute running from the upper story to the laundry in the basement are constructed with wire lath on metal studs, rendering it fireproof.

The lighting is by electricity or gas, as may be preferred, the building being wired and piped for both.

The residence here shown was erected on South Eighth

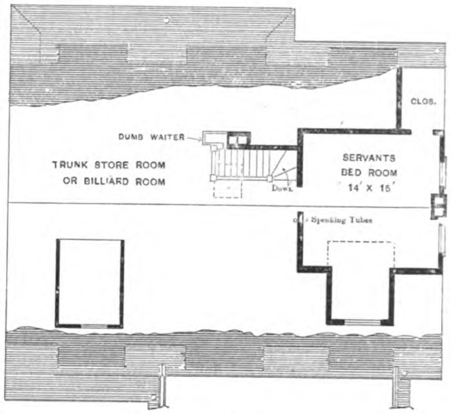
street, Council Bluffs, Iowa, for W. L. Douglas, in accordance with plans prepared by J. C. & W. Woodward, 3 Everett Block, Council Bluffs, Iowa. The contract for the carpenter work was executed by J. S. Furgeson, 144 Harrison street; that for the mason and plaster work by Wickham Bros., 19 Scott street, and that for the heating and plumbing by Stephens Bros., 529 West Broadway, all of Council Bluffs, Iowa.

◆

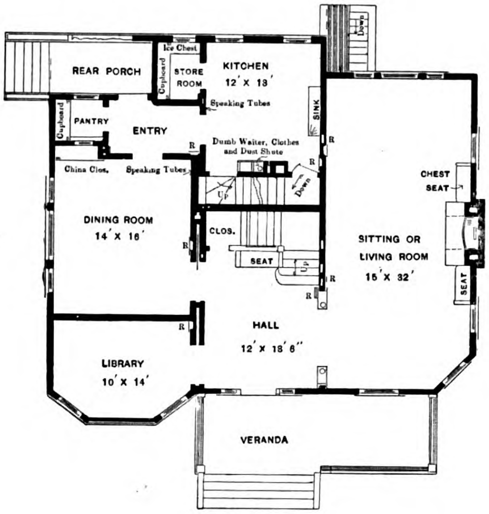
Damage to San Francisco's Buildings Due to Poor Mortar.

After an investigation covering a period of several weeks Dr. T. Nakamura, professor of architecture of the Imperial University of Tokio, and one of the most distinguished members of the committee sent to San Francisco by the Japanese Government to study the effects of earthquake and fire, has completed his labors and recently sailed for Japan to report his conclusions to his Government. In an interview with a representative of one of the San Francisco papers touching his conclusions he said:

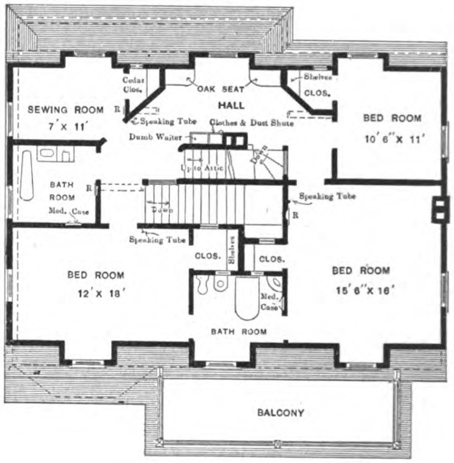
"I find that much of the damage to San Francisco from the earthquake was due to poor mortar and faulty construction, and the greater portion of the damage to the 'class A' buildings by fire was the result of misguided use of hollow tiling and so-called fire blocks instead of concrete. It is an easy matter, I have found, to design a building that will be not only earthquake proof, but practically fireproof.



Attic.



Main Floor.



Second Floor.

Colonial Residence in Council Bluffs, Iowa.—Floor Plans.—Scale, 1-16 In. to the Foot.

"There has developed as a result of the earthquake in San Francisco great prejudice against brick buildings. However, they are largely employed in Japan, where earthquakes of greater severity than the one experienced in this city are not uncommon. The secret of their success, however, lies in the fact that good mortar is used. The mortar should either be composed of 1 part cement to 2 parts of sand or of 1 part cement, 3 parts of lime and 5 of sand. The bricks should be thoroughly wet before being laid, and when the mortar has set under these conditions a wall becomes practically one stone."

Supplementing the above are the views of Theodore Starrett, president of the Thompson-Starrett Company, who recently returned from a business visit of several weeks to the devastated city. Concerning the question of bad mortar as the probable cause of the fire he is reported to have said:

"That little, simple thing called mortar in the brickwork of the chimneys of San Francisco is what probably caused the conflagration. Dr. Nakamura said aright. He called it 'dishonest mortar,' and maybe it was. Maybe it was simply ignorant mortar, but from accounts of intelligent observers who passed through the experience the fire was started in a hundred places throughout the city through defective flues.

"San Francisco has in its newer buildings some examples of fine mortar, too. There is quite a fad out there of building cheap frame buildings with a brick veneer for the lower stories and plaster work above. Some of these houses are really pretty and were designed by good architects. They have brick area and garden walls with brick copings, all laid in Portland cement mortar. Such buildings came through uninjured, even as to the chimneys.

"Everybody knows that in the important buildings in New York Portland cement mortar is used in brickwork, which so firmly attaches the bricks to each other that when it comes to tearing them down the brick wall is a homogeneous mass, the mortar being stronger than the brick. Such mortar is the only kind that should ever be allowed in a building."

◆

One of the more striking features of the 18-story steel skeleton frame building which is going up at the corner of Wall street and Broadway is that the main entrance, on Wall street, will be of solid bronze, massive and beautifully decorated. The space leading to the entrance will be of granite, and the buttresses on either side will support a massive solid bronze standing candelabra. The building will be topped with a beautiful bronze cornice, richly decorated with an elaborate cresting. The interior finish of the building will be steel and bronze, including all doors and windows. We understand that the store and basement of the building have been leased to a

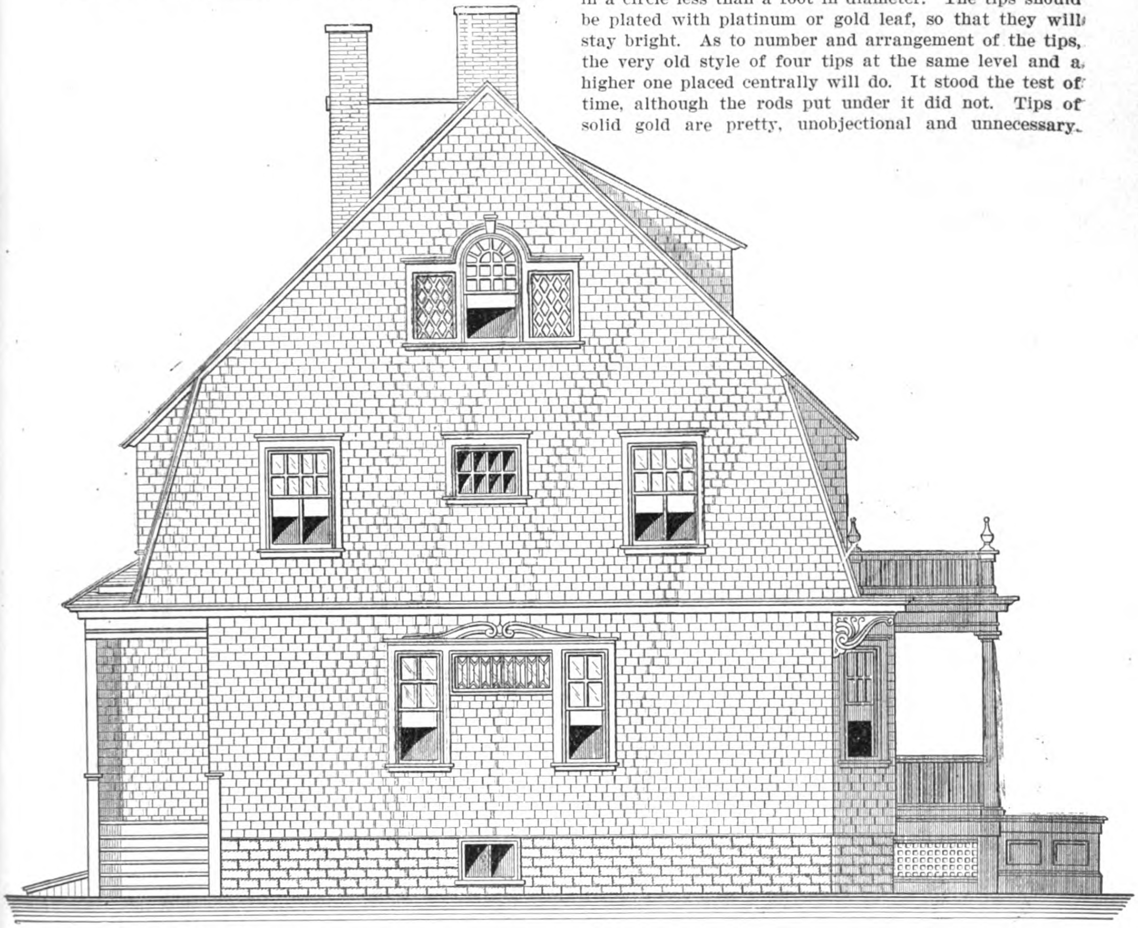
tobacco concern for a period of ten years, for a sum which brings the square foot rental of the store at a trifle over $51 a year. This is said to be the highest store rental on record.

◆

Lightning Rod Requirements.

Some time since a valuable set of specification governing provisions for lightning protection was issued by Henry D. Davis, State Fire Marshal of Ohio, and from the same source comes the following additional information regarding the use of rods:

Rods made from copper wire, if heavy enough to have sufficient stiffness, cost more than one needs to pay for protection. The cheapest effective protection can be had from the star galvanized steel rods, which are made by every manufacturer in the United States who makes a line of rods. Upon these there are no patents.



Colonial Residence in Council Bluffs, Iowa.—Side (Left) Elevation.—Scale, $\frac{1}{8}$ In. to the Foot.

The Lightning Rod Committee of the National Fire Protection Association advises that pure copper rods weigh not less than 6 ounces to the foot, but experience has shown that they need not be that heavy. The $\frac{3}{8}$-in. hard twisted copper rods or $^{7}/_{16}$ in. basket woven rods will carry any ordinary lightning stroke. The manner in which the wires in a copper rod are put together makes no difference in their usefulness as conductors. Some agents have a mistaken idea that the electricity of lightning can be coaxed, cajoled or fooled by a peculiar arrangement of the strands. And, too, there are persons who have a superstition that lightning for some occult reason is partial to a rod having a certain number of strands.

Every lightning rod should form a circuit from the ground over the house and to the ground again. So it is impossible to put up a rod correctly without the "points," as the pieces of rod extending above the roof are called, being jointed on. In putting up rods of copper wire the wires of points or branches should be woven into the circuit and the appliance for holding the point above the roof must be firmly placed. The "copperized" rod is an ordinary steel rod which has particles of copper from a solution of copper deposited on its surface by electricity. In appearance it resembles a solid copper rod of star form and a tricky agent might represent it as solid copper, with intent to defraud. It is less desirable than a plain galvanized steel rod because of the fact that the zinc in galvanizing enters the pores of the rod so that it can never separate, and, too, zinc is immune to oxidation.

A point of the rod should be placed above each chimney and gable of a building and no rod should be turned in a circle less than a foot in diameter. The tips should be plated with platinum or gold leaf, so that they will stay bright. As to number and arrangement of the tips, the very old style of four tips at the same level and a higher one placed centrally will do. It stood the test of time, although the rods put under it did not. Tips of solid gold are pretty, unobjectional and unnecessary. All metal ridging, gutters, ventilators, flues or pipes on top of the building, drain pipes outside it and any water pipe system within it should be anchored to the rod by copper wires.

As to insulation: Any method of attaching the rod to the house which holds it securely will do. About grounding the rod: It is only important that the rod reach earth which is at all times moist. There are numerous devices for assuring permanent moisture at the rod's end. It is unimportant whether the ground end of the rod is attached to a mass of metal, carried to running water or has a patent can tied to its tail—just so it reaches permanently moist earth. The rod may enter the ground near the spill from a rain pipe.

◆

RAPID progress is being made on the new Plaza Hotel, at Fifth avenue, Fifty-eighth and Fifty-ninth streets, New York City, and it is expected that the structure will be

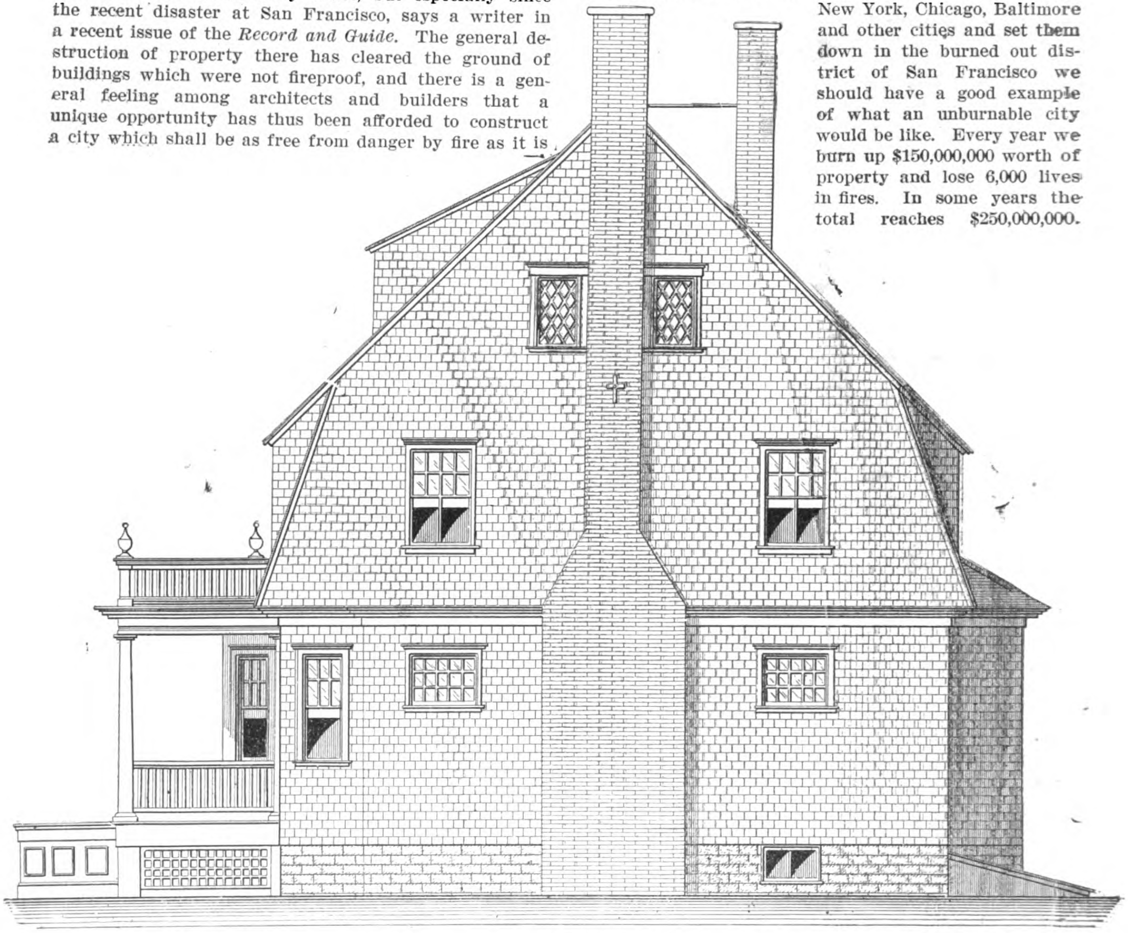
completed in the course of another year. The exterior of the first three stories will be Vermont marble, and the upper 15 stories of enameled cream white brick. The drawings of the hotel were prepared by Henry J. Hardenbergh, 1 West Thirty-fourth street, and the cost of the improvement complete is placed at about $5,000,000.

The Unburnable City.

Will the unburnable city ever be built? is a question that has been asked many times, but especially since the recent disaster at San Francisco, says a writer in a recent issue of the *Record and Guide*. The general destruction of property there has cleared the ground of buildings which were not fireproof, and there is a general feeling among architects and builders that a unique opportunity has thus been afforded to construct a city which shall be as free from danger by fire as it is possible for any city to be. Experts say the practically unburnable city can be built if right steps are taken in the very beginning to make it so. There are already many buildings in various parts of the country which are in themselves quite fireproof. But it is not an uncommon sight to see such structures, embodying all the resources of modern protection against fire, standing in the midst of buildings which have not the slightest claim to be called even semifireproof. When a fire starts in such a district it spreads rapidly and soon assumes the proportions of a conflagration. The fireproof structure standing alone in the midst of hundreds of burning buildings is subjected to a most severe heat and usually suffers considerable damage. It is at once said, therefore, that no building can be made unburnable, and inasmuch as it costs more to build fireproof, people come to the conclusion that as all buildings burn in a great fire not much is gained in going to the extra expense of building fireproof.

But even under the severest trials—as in San Francisco, where fire raged practically unchecked—the modern fireproof structure is the only one that in any way helps to check the flames. This was shown at Baltimore, Toronto, Rochester, and later at San Francisco. In the last city the protected steel structures survived so well that many of them will soon be ready for occupancy again. All this goes to show that the indestructible building is not an impracticable dream. The Crocker building, a steel and hollow tile structure, survived fire and earthquake so well that it is already in use by tenants.

The unburnable city will have wide streets. Its buildings will be fireproof, both as regards methods and materials used and interior fire-fighting equipment. If it were possible to take all the big fireproof structures in New York, Chicago, Baltimore and other cities and set them down in the burned out district of San Francisco we should have a good example of what an unburnable city would be like. Every year we burn up $150,000,000 worth of property and lose 6,000 lives in fires. In some years the total reaches $250,000,000. Still builders are allowed to go on putting up flimsy structures which can do nothing else but burn when the time comes.

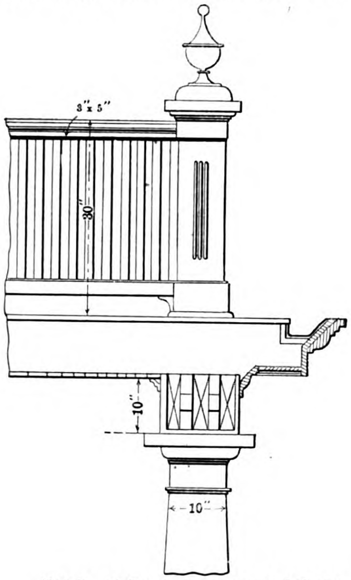


Colonial Residence in Council Bluffs, Iowa.—Side (Right) Elevation.—Scale, ⅛ In. to the Foot.

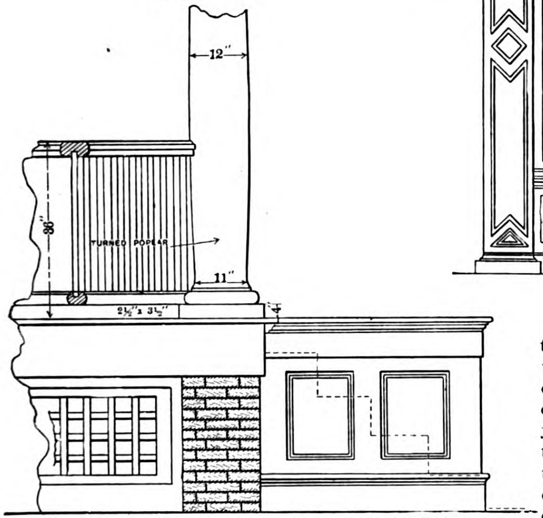
The first thing the authorities of the unburnable city will do will be to draw up a code of building laws which shall forbid the use of any but well tested fireproofing material. They will enforce these laws with rigorous severity. Nothing but the protected steel frame will be allowed for high buildings, and even dwellings will have to be built of hollow tile bricks, cement, or of some other unburnable material which all the great conflagrations have shown to be the most effective. Large floor spaces in warehouses and dry goods establishments will be subdivided and separated by fireproof partitions with fireproof doors and protected stairways. Wire glass will be used for all windows. In large office buildings the elevator shafts will be encased so as to prevent the spread of fire from floor to floor. Standpipes kept under high water pressure with ample hose attached will be common. Automatic sprinklers and chemical fire extinguishers will be everywhere. Furniture will be of steel or bronze, so far as may be practicable. Hotels, apartments, schools, colleges, hospitals, theaters and all public halls will be as

safe as modern ingenuity can make them. Warehouses and factories will have to take particular precautions, especially where highly inflammable contents are on the premises.

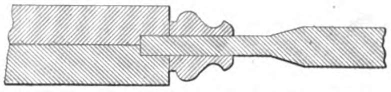
So constructed and equipped the future city will be unburnable. Its insurance rates will be the lowest ever known, because fire underwriters will be the first to encourage, as they are now doing, the universal adoption of every possible precaution against fire. The clanging bells of fire engines will seldom be heard, as the equipment of each structure will generally be sufficient to check any blaze that may start in it. Such a city can be built easily enough. But even the authorities of San Francisco, with blackened ruins still lying about them, are failing to seize the opportunity afforded them and are allowing buildings of the very type which the fire completely destroyed to go up again. In the regulations just issued there is nothing to prevent the same kind of construction that was so prevalent in the old city. This is discouraging to those who look for the coming of the fireproof era, but the era will nevertheless eventually arrive.



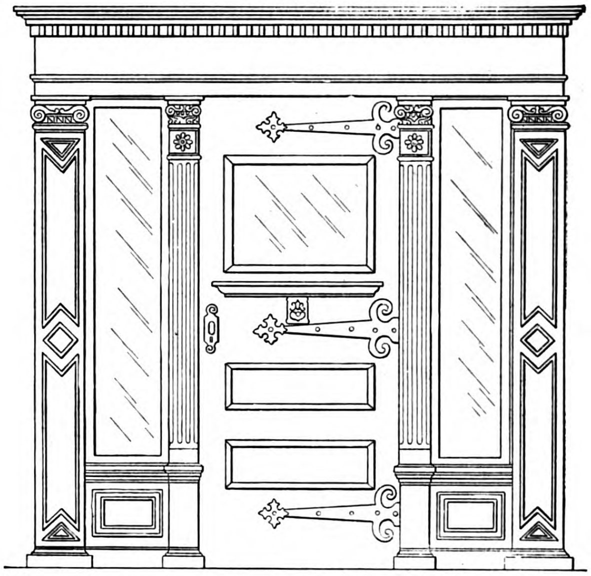
Details of Porch Cornice and Balcony Balustrade.—Scale, ⅝ In. to the Foot.



Details of Porch Construction.—Scale, ⅝ In. to the Foot.



Section of Inside and Outside Doors.—Scale, 3 In. to the Foot.



Elevation of Entrance Door.—Scale, ⅝ In. to the Foot.

Miscellaneous Constructive Details of Colonial Residence in Council Bluffs, Iowa.

The Arch in Stone

By some it is considered that the Egyptians were the inventors of the arch, by others the Assyrians and still others think that the Etruscans or Romans were the inventors of the true arch—that means of support which in the hands of the Romans achieved its greatest triumph and by which Rome was enabled to give that combination of stability and magnitude which distinguished all her works and which is used to-day and probably will be for all time. I shall endeavor to trace the earliest examples of the arch in ancient countries and give a description of each in as clear and concise a manner as is possible from the data at hand.

I will start with the Egyptian, as I believe the earliest forms of arches are to be found in the pyramids of Egypt, says J. R. Kimball in one of our English exchanges. It is evident that they were acquainted with the arch and its properties, as they used it in many of their less important buildings, but they knew that its employment generally would introduce complexity and confusion in their designs and therefore they wisely rejected it from their more important buildings, although the roof of the tomb chamber of the third pyramid (between 3000 and 3500 years before the Christian era) was constructed of huge blocks of stone set obliquely and extending from the side walls, on which they rested, to the center, where they met at an obtuse angle. Internally these blocks had been coved out after being put in place, and the roof of the chamber was thus a pointed arch of a compressed character, which, though not exhibiting any engineering skill, since they were merely cut in the rock, imply at any rate an appreciation of the beauty of coved ceilings, and suggest, if they do not prove, an acquaintance with the arch; and again, over the entrance of the Great Pyramid are four stones placed at an angle and meeting so that they support each other and act as an arch, taking off the pressure of superincumbent masonry. It is supposed that this same construction has been employed along the whole passage until it enters the rock; this it does at the distance of about 120 feet from the outer air. And again at Beni Hassan, over 2000 years B. C., curvilinear forms reappear in the roofs, used in such a manner as to render it almost

common practice of building on foundations consisting of independent bases for supporting columns. This permits considerable variation in motion. "Hereafter, I am convinced no large building should be constructed in San Francisco except on a monolithic foundation of reinforced concrete, which would give absolute rigidity to the foundation and greatly reduce the flexibility of the structure if built of steel.

"My own specialty is concrete buildings, and while I believe that reinforced concrete is the ideal building material for the whole structure in the earthquake country, giving to the entire building the same motion and preventing the meeting of counter motions, still I do not mean to say that steel construction is not to be followed in such a country.

"With both steel and concrete construction the ornamental wall is built independently of the remainder of the structure. In case of an earthquake this is thrown to the ground, endangering the lives of people in the street. In such a country, where buildings are of concrete it would be well to make the ornamental finishings of the concrete itself, thus leaving nothing to be thrown down, and thus adding to the safety of the public and of the buildings.

"But whatever the material to be used in the rebuilding of San Francisco it ought to be the first consideration to obtain as great rigidity as possible, and at least the foundations should be of reinforced concrete in a solid body, covering the entire ground surface on which the edifice is to be reared."

Bricklayers of Thirty Years Ago.

Apropos of the discussion which was carried on in these columns some months since relative to the amount of work which the average carpenter of the present day ought to be able to execute, it is interesting to note the plaint of a builder who was actively engaged in the business something like 30 years ago. In a communication to a recent issue of the *Record and Guide* he sets forth his views in the following words:

When I look back to the good old days when men worked and compare the conditions as at present existing, I feel that notwithstanding what some say about the benefits of unionism the detrimental effect of organization upon labor is very great.

Thirty years ago a bricklayer was ambitious to become a lineman; it was the builder's custom to pick out his best men and put them on each end of the wall; they were in charge of the line; as soon as they had laid up the ends they called "line" and raised the line for the next course. The men in between were compelled to work at a speed set by the linemen, and failing to keep up with them were considered less worthy and were retained only as long as was absolutely necessary. The men who were able to keep up with the linemen were most steadily employed.

A builder watching his men at work was enabled in a few minutes to figure how many brick could or would be laid in an hour, and by using the same linemen on his work he had a good idea of the result in advance, as far as his labor was concerned. These linemen did not work at their top speed, but assumed a steady gait and expected the others to keep up with them. The men in between were ambitious to become linemen, and the net result was a steady, conscientious amount of work which to-day is absolutely unknown.

A man who laid 3000 brick a day was not an unusual man, and there are some men in the building business still who tell of 4000 to 4500 brick for 10 hours. To-day 800 brick in eight hours is considered an average day's work.

What has caused this condition? Men are just as strong as they were; men are just as intelligent as formerly, but a rule of the bricklayers' union has come between the ambitious man and his employer. If the lineman calls "line up" before the other members of his union on the wall are ready he is reported to the union and fined $25 for the first offense and $100 for further violation of this union regulation. In other words, the slowest man sets the pace for all the others, because he is a member of the union and must be protected in his laziness and indolence.

What incentive is there for a man to be better or more competent than another, when he is threatened with losing a week's pay if he does not keep down his speed?

A builder can employ only members of the union, and in busy times there are not enough men of any kind to do the work, to say nothing of their incompetency. Apprenticeship is limited and the supply of mechanics in every line is decreasing in direct proportion to the increase of the amount of work to be done. Something is certainly wrong; wages are increasing, hours are decreasing, the amount of work to be done is multiplying many fold, and to cap the climax the union limits the amount of work a man may do.

Formerly a good man was paid more than an inferior man; the good man saved some of his surplus earnings and eventually started in business for himself. To-day the statement is heard on every side that the mechanic cannot advance the way he did in the olden days; that once a mechanic always a mechanic; simply because a good mechanic is as poor a mechanic as the poorest; they are brothers in the union and the union comes first, ahead of ambition, ahead of conscience and almost invariably ahead of the family.

KNOTS, HITCHES AND SPLICES FOR THE BUILDING MECHANIC—I.

By Edward H. Crussell.

AMONG the many things outside of his own trade or calling of which the building mechanic must have a knowledge, it may be claimed that the art of tying and properly using knots is as important as any. In fact, hardly a day passes, even in private life, in which we are not called upon to make a knot of some kind. And to the man who has to do with the raising of heavy timber framing, the moving of buildings, or work of like nature, a knowledge of the proper use of ropes and knots is an absolute necessity.

The writer has had some little experience in this class of work, and has been in a position to note that the average mechanic's ideas concerning the tying and using of knots are somewhat limited, which is scarcely to be wondered at when we examine the source from which he is to obtain his information. In the opinion of the writer, a knowledge of the proper use of knots is just as important as a knowledge of their formation (a knot which is excellent in one position being very often entirely out of place and worse than useless in another). I have thought, therefore, a few words on the subject, written by a workman in the simple language of the workman, explaining not only the formation of the knots, but giving also some hints as to the purposes for which they may be used, would prove acceptable to that class of mechanics who are ambitious enough to wish to better themselves in every possible branch of their trade.

Only the more useful knots will be shown, with perhaps one or two fancy or trick knots to make the subject interesting. But the novice may feel assured that if he has these thoroughly mastered he will be able to overcome any difficulty in the matter of knots that may be presented to him in his daily life.

The best thing to practice with is a piece of cotton clothesline, about ¼ inch diameter, and a stout piece of cord, or chalkline, carried in the pocket, will enable him to practice during any spare moments he may have in the day and so keep the subject fresh in his memory. I must here caution the student that tying knots in short piece of twine while looking at a picture of th and tying knots in a big unwieldy rope while the eyes the boss are upon him and a dozen men are waiting

his efforts, are two entirely different things. He must therefore endeavor to secure as much practice as possible under actual working circumstances. A knot which will look all right in a piece of twine may in a 2-inch rope look as clumsy as a wooden legged camel.

Before leaving this part of the subject I wish to say that I hope in the ensuing pages to make myself understood, but I find that tying knots is one thing and explaining on paper how they are tied is quite another. It is more than possible that to the man who already knows all about knots some of the explanations will appear to be too elementary and tedious, and I hasten to assure him that they were not written for him, but the other fellow. It is also possible that to the other fellow some of the explanations will not be sufficiently explicit, and to him I will say that the correspondence columns of the paper are open to all, and if he will state therein his difficulty I will do what I can to assist him. And now having finished with the preliminaries we will proceed to business.

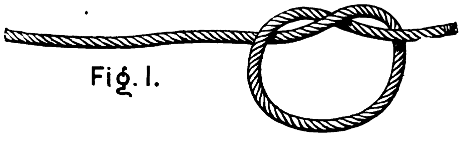


Fig. 1.

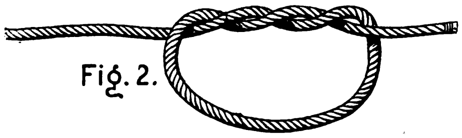


Fig. 2.


Fig. 3

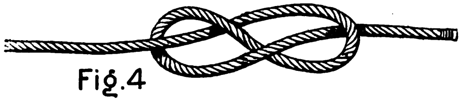


Fig. 4

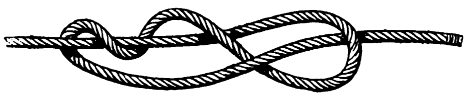


Fig. 5.

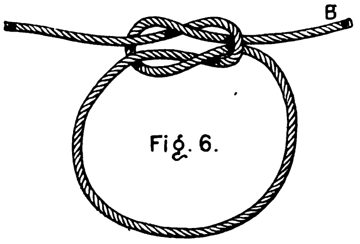


Fig. 6.

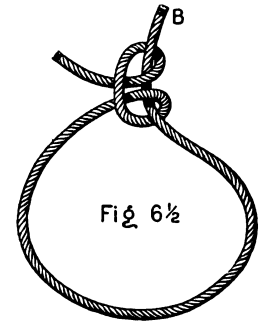


Fig 6½

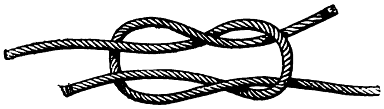


Fig. 7.

Fig. 1.—Overhand or Round Knot.
Fig. 2.—A Double Knot.
Fig. 3.—Double Knot Pulled Tight.
Fig. 4.—A Flemish or "Figure 8" Knot.
Fig. 5.—The Stevedore's Knot.

Fig. 6.—A Reef Knot.
Fig. 6½.—Reef Knot, Slipped, by Pulling on B.
Fig. 7.—The Thief Knot.

Knots, Hitches and Splices for the Building Mechanic.—I.

The simple overhand or round knot, with which every one is familiar, is shown in Fig. 1 of the illustrations. It is used chiefly as a stop knot, is also tied in the ends of cords to prevent them unraveling, and forms part of many of the more complicated knots.

A variation of Fig. 1 is presented in Fig. 2, which is a double knot. Fig. 3 shows it pulled tight. This may be used for a large, permanent stop knot to prevent the end of a rope from pulling through an eye or other fastening. Increasing the number of turns increases the size of the knot. It may also be tied by making two or more loops before passing the end through, which makes the same kind of a knot.

A Flemish or "figure 8" knot is presented in Fig. 4. This will make a larger knot than Fig. 1, and will not jam so tight. To tie it commence as in Fig. 1, but instead of passing the end up through the bight bring it round behind the standing part and pass it down through. This knot also forms part of other knots, which we shall come to later.

The stevedores' knot, represented in Fig. 5, is a variation of Fig. 4, and is made by passing the end once more around the standing part before putting it down through the bight. This is used as a stop knot also, the difference between it and Fig. 2 being that it does not jam and is easily untied once the strain is taken off.

In Fig. 6 of the illustrations is shown the reef knot, also called a square knot, or true knot. It is used on shipboard to tie the reef points of the sails, whence it obtained its name. It contains all the principles of a good knot, is easily tied, does not jam and is readily untied. To tie it commence by passing the end in the right hand under that in the left, and form the first half of the knot. In forming the last half take care that each end when doubled back lies alongside its own part, as shown in the illustration. If you find the knot forming like that shown in Fig. 8 untie the last half and make the twist in the opposite direction. To untie this knot, take hold with each hand just behind the loops and push the hands toward each other. This is called "upsetting" it.

The reef knot may be used for a variety of purposes, chiefly as a finishing off knot for tying a bag or a bundle or a bootlace, or to tie the ends of a short piece of rope together to form a sling. When using it for this latter purpose it is best after the knot is tied to make a half hitch with the ends around the standing part. This may prevent some genius from slipping the knot by pulling on one of the ends, as shown in Fig. 6½. The reef knot may also be used to unite two ropes in order to lengthen them if they are of the same size, but if one rope be of a larger diameter than the other we must then use the weavers' knot, or sheet bend, which we shall study presently.

The thief knot, represented in Fig. 7, is rather a peculiar knot and one that is very little known under its true name. I say under its true name, because most

people call the granny a thief knot. Some people will claim that there are two ways of tying a reef knot and class this as the second way, but although it bears a close resemblance to the reef knot (I have shown the reef knot as part of a loop in order to show more clearly the difference) it is really no relation and must not be used for any purpose where safety is required.

The story runs, that it was used by its inventor, the captain of a fishing smack, to tie the mouth of his biscuit bag, so that he might be able to tell if any one was stealing the biscuit. The thief, of course, would imagine that it was an ordinary reef knot, and would use a reef knot when he tied the bag again, and by this means was caught. It is from this circumstance that the knot takes its name. This is the "yarn" that the old "salts" on the fishing smacks tell the boy or apprentice, and you may be sure that in their version of it the boy is always the culprit.

The celebrated granny or lubbers' knot is shown in Fig. 8. I have never yet met anybody who had to be taught how to tie it—it seems to be born with us, like original sin. Simply take two ends of a cord, shut your eyes and knot them, and there you are. This knot should never be used, because in stiff cord such as braided sash cord it will slip, and in small cord it will first slip the length of itself and then jam.

The knots that we have examined so far are fairly well known, and very little that is new or original concerning them could be written, though it has been necessary to show them in order to render the subject complete and intelligible.

In the weavers' knot, Figs. 9 and 10, we have, however, a very excellent knot, the virtues of which are not as well known as they ought to be. It is used by weavers to tie the ends of the threads in weaving, and is also called by them a "thumb knot," owing to the manner in which the thread is brought around the thumb in tying it. The speed with which this knot can be tied by the practiced hand is almost beyond belief.

In order to tie this knot as the weavers do, take an end in each hand, pass the right hand cord, A, under the left, and bring it around the left thumb and between the two ends, as shown by Fig. 9, with the forefinger of the right hand bring the end B over until it lies alongside its own part, and complete the knot by pulling on the cord in the right hand. When done rapidly the whole knot appears to be made with one motion. Fig. 10 shows the knot complete. Practice it till you can tie it quickly and use it in preference to any other knot wherever possible.

The "sheet bend," as represented in Fig. 11, is used on shipboard for fastening and adjusting the sail.* and is exactly the same as the weaver's knot, but cannot be tied in the same way, because one part of the knot is already formed by the clew of the sail. It would be rather difficult to tie a knot after the manner of Figs. 9 and 10 in a rope of large diameter. We therefore tie it as in the sheet bend. First form a bight in the left hand with the end of one rope, then pass the end of the other up through the bight, around behind, across the front, and under its own part, as in Fig. 11. This knot may be used for uniting ropes of different diameters and in such cases should be tied like Fig. 12—the double sheet bend, in which A is the smaller rope. The double sheet bend is stronger than the single, and will not jam so tightly, though there is really no danger of either of these knots jamming or slipping. Right here it may be mentioned that as a general thing the greater number of turns there are in a knot the safer it is and the less liable to jam.

The fisherman's knot, shown in Fig. 13, is also a good knot for joining ropes, the strain being equally divided between the two knots. It is simple to learn and easy to remember. In order to tie it lay the two ropes alongside each other, tie an overhand knot, with the end of each rope around the standing part of the other, and pull the two knots together. To untie it pull the knots apart and untie each knot separately. A double overhand knot may be used instead of a single and will increase the holding power of the knot, but it will make quite a bundle if tied in a large rope.

When moving buildings it is often necessary to lengthen ropes by tying them together. This is especially the case in railroad work, where we are often enabled to get a pull with an engine if the rope is long enough, and some one of the preceding knots will always fill the bill.

◆

The Public Building bill recently passed by Congress carries appropriations amounting to a trifle over $21,000,000.

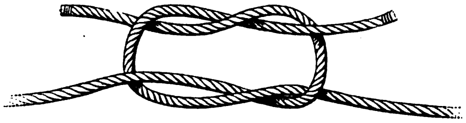


Fig. 8.

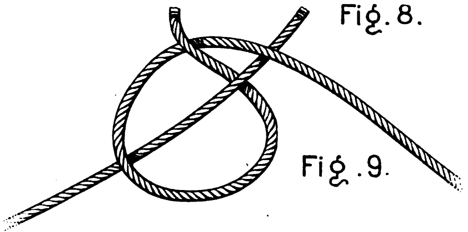


Fig. 9.

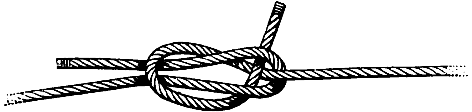


Fig. 10.

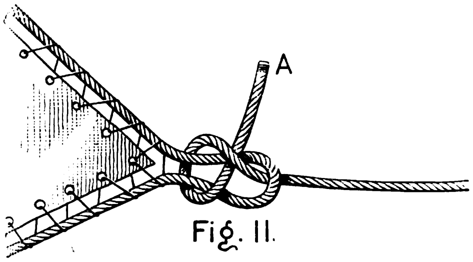


Fig. 11.


Fig. 12.

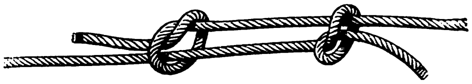


Fig. 13.

Fig. 8.—Granny or Lubber's Knot.
Figs. 9 and 10.—The Weaver's Knot.

Fig. 11.—The "Sheet Bend."
Fig. 12.—The Double Sheet Bend.
Fig. 13.—The Fisherman's Knot.

Knots, Hitches and Splices for the Building Mechanic.—I.

---

* It may not be necessary, but it can do no harm, to mention that "sheet" in this case does not mean the sail, but the rope is used for fastening it.

ARRANGEMENT OF KITCHENS AND PANTRIES.

A VAST amount of interesting information touching various phases of the planning of a modern house has come from the pen of Robert C. Spencer, Jr., the well-known Chicago architect, and in back numbers of this journal we have from time to time given extracts from his contributions to the architectural press. In the present issue we lay before our readers some comments which he makes on the arrangement of kitchens and pantries and which appeared in a late issue of "The House Beautiful." The plans accompanying the author's comments clearly indicate the arrangements suggested, and will doubtless prove of suggestive value if carefully studied by those who are interested in convenient quarters for the culinary department of the household. Mr. Spencer says:

We may simplify our houses by dispensing with the old-fashioned parlor. We can exist without reception rooms. We can have our books, our music and our sideboard all in one room, if it be large enough, but we have not yet arrived at the "kitchenless homes" advocated by a certain clever but unconvincing lady who writes for the best magazines. True, there are many, very many cookless homes, but it is also true that no cook can do good work or would care to accept a life job in an ill-arranged, dark and dismal kitchen.

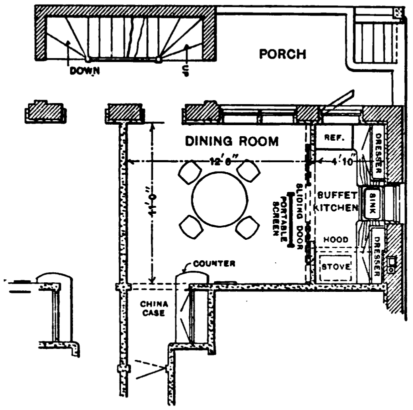


Fig. 1.—The Dining Car Kitchen for Small Flats.

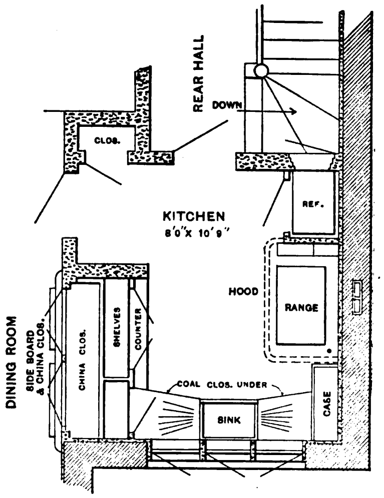


Fig. 2.—Kitchen for a City House.

Arrangement of Kitchens and Pantries.

In planning a house the most careful study should be given to the kitchen and its adjuncts to make it convenient according to the needs of the owner, sanitary and attractive.

The accompanying plans illustrate kitchens, pantries, &c., varying in size and arrangement from the buffet kitchen of a small servantless flat to the service wing of a large country house, in which five or six servants are employed. Upon this question of servants largely depends the arrangement of the kitchen. For the servantless house, in which madame is the cook, a small, compactly arranged kitchen is a labor saver. There are no better examples perhaps of compact and conveniently equipped kitchens and pantries than those of the modern dining car. The dining car kitchen or galley idea, Fig. 1, was successfully carried out in the small flats at 6901 Normal avenue. For cold storage the refrigerators serve at all seasons. Each has an outside door, through which the ice chamber is filled in warm weather. At other times this door is left open to admit the outdoor air. Drawers above and a case of drawers under each drain board serve for storage of supplies and utensils. Over the gas range is suspended a horizontal range boiler with a gas burning water heater on a bracket under the boiler, there being no janitor employed to run a water heater in the basement for all the tenants. The partition between kitchen and dining room consists of two fixed single-panel doors, one on each side, and two sliding doors to match.

The first tenant who occupied one of these flats furnished and kept her flat with exceptional care and taste. Blue and white jars on the dresser contained spices, baking powder, &c. Flour, sugar, &c., were in bin drawers, to be described later. A portable screen made it unnecessary to close the sliding doors. A hood over the range, built of studding and plastered on metal lath, with a combined smoke and ventilating thimble close to the ceiling under the hood, removed the fumes of cooking almost entirely as fast as they arose.

The dining room furniture was of simple "Mission" design in weathered oak. Altogether it was quite as inviting as a small dining room in a flat could be.

In Fig. 2 is the plan of a kitchen of a unique little city home at 6448 Minerva avenue, whose mistress had some excellent practical ideas of her own and a desire to solve the servant problem by having none. For so tiny a kitchen it contains a great deal of storage space. The refrigerator is built into a closet or compartment with a door about 4 ft. high. Above this is a cupboard with doors. Ice is put in from the basement stairway, the house having no rear entrance or kitchen porch. This refrigerator appears to waste no ice, although so close to the range, the walls of the closet being well insulated. There being no pantry, cold storage during the cooler months is provided by a closet or cupboard under the right hand drain board of the sink. A small opening in the outer wall, with a door operated easily by a metal arm from within, admits the outer air. A novel idea in the plumbing of the sink is the installation of a single combination cock for hot and cold water. As the warm water is supplied by a coal burning water heater and 60-gallon storage tank in the basement, it is usually piping hot, and it is a decided convenience to be able to temper the flow from a single faucet, by means of this combination cock.

Another excellent "wrinkle" is the installation of a large wall filter with a faucet, just above the sink, through which the city water flows for cooking and drinking.

The counter to the right of the sink, over which is a dresser with glazed doors, is level with the counter of the built-in sideboard and china cases in the dining room, and a slide connects them, saving many steps in handling dishes. Over the range, of course, there is a plastered hood and ventilator.

With its woodwork painted ivory white, the walls a very light sea green, and its three casement windows set

with leaded glass, this little kitchen ought to make even dish washing a pleasure.

Fig. 3 is a kitchen planned on similar lines for a modest suburban home, also servantless, yet large enough to meet the needs of a family having one maid. The refrigerator, with an outside door, takes the place of a kitchen pantry for cold storage when ice is not needed, as in the flat kitchen already described.

In both of these plans a serving pantry is lacking. Dishes and silverware are stored in large china cases in the dining rooms and many extra steps are saved by the direct communication between kitchen and dining room. With a hood and ventilator over the range, a simple and hygienic regimen, with the frying pan largely tabooed, and the connecting double acting door properly placed and hung, and perhaps a portable screen placed where it will do the most good, there is much to be said in favor of this simple arrangement. It surely commends itself to those who would lead the "simple life."

In Fig. 4 is shown a plan of the kitchen of a house recently built in Milwaukee—a one servant house, which could accommodate two. Like the preceding one, this kitchen has convenient access to the one staircase of the house, which is inclosed and reached from the entrance hall through a double acting door with a long panel of leaded glass. A hand power trunk lift, with sliding door, opening into the small stair hall is a great convenience, as it practically takes the place of a back stairway in this three-story house.

The pantry arrangement is the usual one for houses of the better class. The kitchen and the serving pantry sinks are conveniently connected though a slide, the drain boards being on a common level. The sink back is a single slab of Tennessee marble over 8 feet long. The drain boards, made of white ash, are easily removable for cleaning. Under each is a drawer with front sloping inward at bottom. Under each drawer is a new kitchen convenience devised by the writer and illustrated in the photograph. It is simply a cupboard for pots, pans and covers, pivoted at one end to swing out at right angles into the room. The two lower shelves are for pots and pans, and the top shelf for covers, &c. The advantages of such a device over the ordinary dark and mysterious cupboard under a sink, or the ordinary ill-ventilated pot closet, will be evident to every good housekeeper. The peculiar plan of this kitchen provides a nice light alcove for the range, with its adjacent window.

Fig. 5 is a kitchen for a two servant house with the

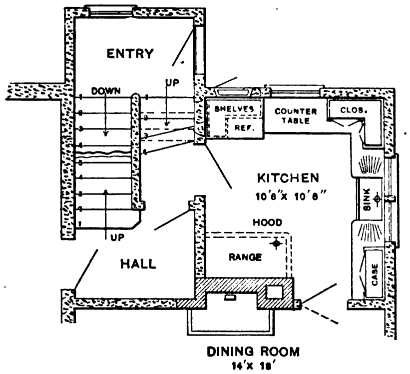


Fig. 3.—Kitchen for Modest Suburban House.

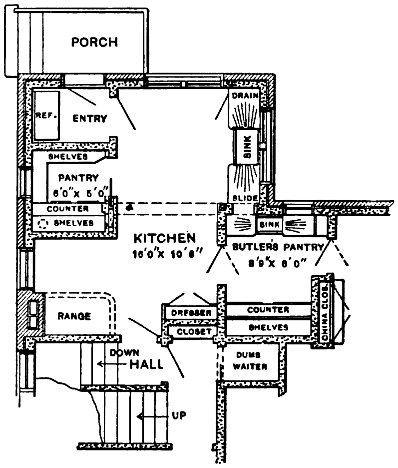


Fig. 4.—Kitchen in a One-Servant House.

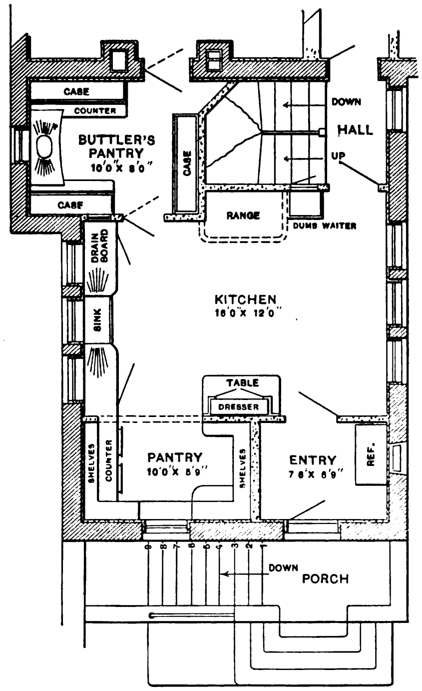


Fig. 5.—Kitchen for a Two-Servant House.

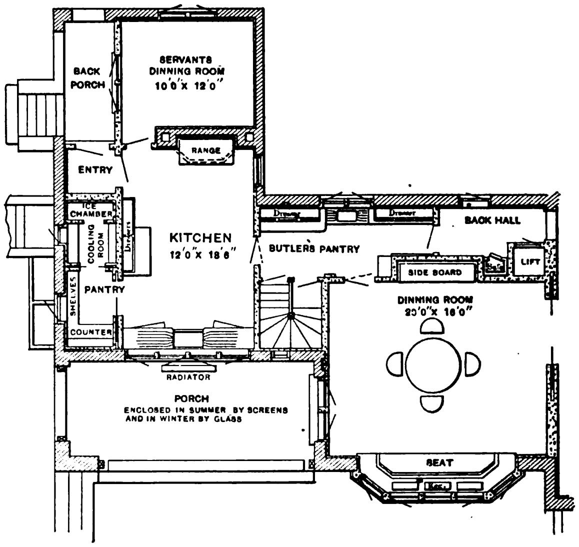


Fig. 6.—Service Position and Dining Room of a Fair Sized Country House.

Arrangement of Kitchens and Pantries.

pantry treated as an alcove, an arrangement liked by some housekeepers.

Fig. 6 illustrates the service portion and dining room of a good-sized country house at Canton, Ill. With more than two servants a separate living and dining room for them—commonly referred to as the "servants' hall," is almost a necessity. It should be so placed as to be accessible from outside without crossing the kitchen. The photograph, Fig. 10, shows the combination coal and gas range in this kitchen, with its ventilating hood and the leaded casement window adjacent. The cooling room, reached through the pantry, is used for cold storage only when ice is not needed. During warm weather the large built-in refrigerator, which extends from floor to ceiling (with ice chamber opening into vestibule), is sufficient for all purposes.

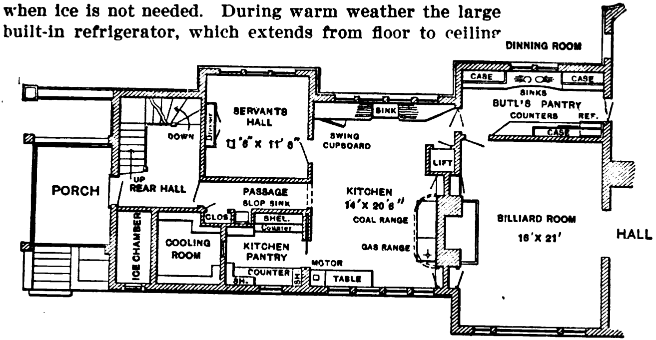


Fig. 7.—Service Wing of a Larger House Than Fig. 6.

Fig. 7. The service wing of a new house at Winnetka is more ample, the kitchen having the advantage of full east and west expanses. Through the leaded glass windows, in which are touches of yellowish green glass, are seen the breakers of Lake Michigan on one side and a long sweep of lawn and garden on the other. For beating eggs and cake, grinding and polishing knives and buffing silver a small electric motor is connected with wires installed for this purpose through the wall at the right of the long table. The annunciator is recessed into the wall and cased to match the white woodwork of the room. Below it is one of eight automatic intercommunicating telephones with case and receiver finished in white enamel. The floor of the kitchen, pantries and servants' hall are covered with a beautiful blue-gray German linoleum having a soft granulated texture, like a water-color. Small decorative units of square form in very pale blue-gray give it a pleasing touch seldom found in linoleum patterns.

The cooling room off the pantry is equipped with shelves of tinned wire. The ice chamber, into which the ice is unloaded directly from wagons, has a capacity of over two tons.

Four servants' bedrooms, with bath, &c., occupy the second floor of this wing. These hints may prove suggestive.

Fig. 8 illustrates the service wing of a large country house designed to meet about the same requirements as Fig. 7. This wing, owing to the peculiarities of the site, lies at an oblique angle with the living apartments. In the planning of a large country house it is often advantageous to isolate the service wing by designing it practically as an annex or separate building, connected with the house conveniently for service. This idea is sometimes adopted in the planning of comparatively small summer homes and bungalows. In hot climates or during the warm season it is an excellent arrangement. Fig. 9 shows how such a wing was planned to accommodate five servants, kitchen, laundry, pantries, &c. The kitchen and pantry ell, connecting the dormitory and laundry with the house proper, is but one story in hight.

Concerning certain points of general application in planning and equipment: Sinks should be "roll rim," of enameled iron or porcelain, supported on enameled iron brackets from the wall, not on legs, which interfere with cleaning the floor. They should have no wood rim or inclosure at front or back. Drain boards should be of white ash (mahogany is still better if it can be afforded), and always removable, with copings at back. A harp "drip" should be cut under edges of boards. Sinks should be under or adjacent to windows, preferably sunny windows.

Water pipes will not freeze if properly boxed and insulated. Get all the light and air possible into your kitchen, let it be one of the sunniest, lightest rooms in your house. Kitchens usually have too many doors. Slide the pantry door and it will never be in your way. In fitting up a kitchen pantry have an ash or maple counter, and under it all the drawers you have room for. Deep "bin drawers" on hardwood antifriction extension slides, and fitted with removable tin linings, are convenient for sugar, corn meal, whole wheat flour, &c. They are sufficiently large for white flour taken from the bag, in small households. Wherever there are drawers under sink drain boards or pantry counters the upper drawer front should slope inward at the bottom, or the entire front of drawer case should slant, to accommodate the feet and knees of those working at them.

There should be sufficient space with direct or left-hand light for the kitchen table. If against the wall, a wall dresser above the table will be a great convenience. Dressers, shelves, &c., as many as possible, are needed in pantryless kitchens. A patent flour can, with rotary sifter in the bottom, resting on a ledge on the wall convenient to table or bread counter, is a convenience which ought to be more generally used.

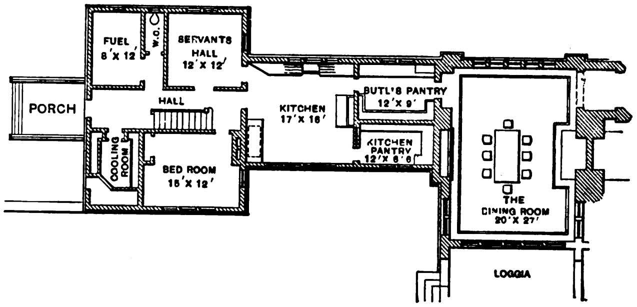


Fig. 9.—Serving Wing Designed as an Annex.

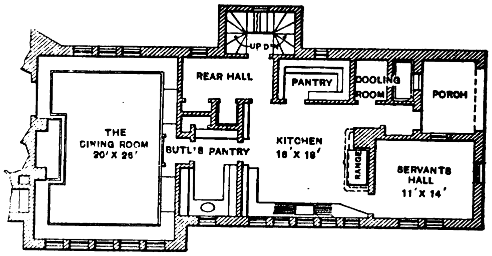


Fig. 8.—Service Wing of a Country House Designed to Meet About Same Requirements as Fig. 7.

Arrangement of Kitchens and Pantries.

Kitchens should have an abundance of artificial light. There should be one outlet in the center, one bracket light next to range and one over the sink, with a porcelain reflector.

The best floor for kitchens, &c., barring tile, mosaic, &c., which are too expensive for general use, is white pine, planed smooth and covered with linoleum in 12-ft. breadths, before the piping to sink is connected and the floor molding is in place.

Kitchen walls should be plastered with cement or a hard patent plaster, and painted.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY. - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

AUGUST, 1906.

Appreciation of Sanitation.

There is no question that the belief is current to-day that the great mass of people have either some conception of the importance of sanitation as a conserver of public health or have some hazy idea that there is such a thing. No better proof of this fact could be drawn from recent history than the record of the conditions that existed in San Francisco in the days immediately following the memorable 18th of April. It takes no imagination to picture the experience of the loss of modern conveniences suffered alone by the crowds huddled in the two great park reservations of that city. The water supply main had been broken, no sewage disposal system was available, the city refuse incinerator was wrecked and the regular system of garbage collection was naturally disrupted, while to make matters worse the sick and the well were brought together in dangerous proximity. Notwithstanding all this, word has yet to be received of an epidemic of sickness, and the apparent success that San Francisco has achieved in bringing herself unscathed from a bed fertile in contagion is a spectacle that the whole world views with pride. The fact is all the more marvelous when it is recalled that the larger part of the refugees were probably from the lower walks of life, counting amount their number many with the vague idea of the requirements of the preservation of the public health, for large numbers of those abundantly able to do so early hastened away to neighboring cities and to those farther beyond. The reason that this happy retrospect is possible is that the city had a group of energetic, able officials who were thoroughly alive to the situation and who earnestly attempted to prevent the spread of disease. If they had not been assisted, however, by a generally intelligent public much of their efforts would undoubtedly have proved futile, and no little part of the general good result is therefore the outcome of the constant hammering which has been done by educators to bring the public mind into a ready appreciation of the things which make for public safety.

Sanitary Measures Adopted.

Incidentally it may be interesting to briefly indicate what measures were taken. During the trying days immediately succeeding the fire circulars were issued by the Board of Health to the following effect: That all water, whether for drinking, bathing or cleansing, and no matter whence its source, should be boiled; that all milk, whether used by infants or adults, should be boiled; that foods in cans should not be allowed to stand uncovered; that vegetables should not be eaten uncooked; that all butcher shops and bakeries should be screened; that all garbage, animal and vegetable refuse should be put into garbage barrels at the street curb line and covered with chloride of lime daily; that all toilets and other plumbing fixtures in houses where sewers were broken or disconnected should be sealed, and that all windows, doors and openings should be screened to prevent the entrance of flies, as they are carriers of filth. The disposal of night soil was effected by the use of ditches dug in the sandy soil. Over the contents chloride of lime was frequently spread with alternate coverings of sand. In the streets latrines were generously provided, usually over manholes of the sewerage system. In the refugee camps established on the grounds of the University of California water closets, which were connected with sewers, had their seats frequently washed with corrosive sublimate, and for night use urinal pails were provided at intervals in the streets of tents, the pails being emptied and sterilized every morning and stored apart during the day. Such were some of the precautions which effected the surprising but gratifying immunity of San Francisco from pestilence.

An Apartment House of Italian Villa Type.

A new apartment house, which so far as its exterior appearance is concerned will mark something of a departure from the conventional type of architecture for structures of this class, is about to be erected on Riverside Drive, and will, when completed, be among the largest in the city if not in the country. It will be known as the Hendrik Hudson, will be of the highest type of fireproof construction and will cost about $1,000,000. The façade of French limestone, brick and colored terra cotta will in its general scheme be that of an Italian villa with wide projecting Spanish tile roof supported by large ornamental bronze brackets. According to the plans of Rouse & Sloan, the architects, the building will cover a plot fronting 208 ft. on Riverside Drive and 135 ft. on 110th and 111th streets, New York City, and is planned with a system of exterior courts so that all apartments face the Drive or a street. There will be nine apartments on a floor consisting of 6, 7, 8 and 9 rooms with two and three baths. All the principal living rooms will be arranged around a large foyer in each apartment and separate entrances to it and to the kitchens will afford the largest measure of privacy. The elevators will be grouped around a central court. The Riverside Drive elevation will have two towers above the main roof connected by a pergola. At many of the windows will be wrought iron balconies in which plants will be placed during the summer, and with its colored terra cotta and red tile, together with this use of foliage, the structure will harmonize effectively with Riverside Drive surroundings. It is expected that a 12-story addition will later be erected, as the owners of the apartment house have acquired the remaining frontage on 110th street and the greater part of that on Broadway. With the completion of this addition direct communication will be made with the 110th street station of the Subway.

Value of New Buildings in 1905.

Some time ago we called attention in these columns to the value of the building improvements projected in a number of the leading cities during the past year and made mention of the fact that the volume of operations had never before been exceeded in the history of the country. Apropos of these remarks the United States Geographical Survey has just issued a report showing the value of the buildings for which permits were issued in 1905 in 47 of the leading cities. According to these figures 184,416 building permits were issued, and structures valued at $640,555,641 were erected. As might naturally be supposed the largest expenditure was made in the Boroughs of Manhattan and the Bronx, which the Federal Government designates as "New York," giving

Brooklyn the dignity of a separate city. The figures are respectively $178,032,527 and $73,017,706. The third city on the list is Chicago, with 16,150 permits for buildings costing $65,000,000, while in the case of Philadelphia, where more buildings were erected than in New York, the cost was much less, being placed at $34,416,745. In the same 47 cities in 1904, 139,373 permits were issued, and the cost of the buildings erected was $466,699,710. The boom in building operations in Brooklyn as in the city of Philadelphia indicates an expansion of the home area and the development and settlement of sections that have hitherto been unimproved because unoccupied.

Labor Unions and the New San Francisco.

It seems not to have occurred to those responsible for the policy of the labor unions in San Francisco that it will depend much upon them to what extent and with what rapidity the city is restored. The fearful handicap of the disaster of April 18 must be faced and combated at every step in the painful process of creating a new city that shall have some semblance of the attractiveness of the old. Already there has been a migration to other cities in the Coast region and tens of thousands have left San Francisco never to return. Those who venture their capital on the site of to-day's ruin will need every encouragement. Instead, if reports are to be believed, the exactions of the labor unions are even greater than those that in other days made San Francisco notorious for the tyranny of the "sand lots." At $8.50 a day for bricklayers and $12 for carpenters, and the insistence of the unions that no independent mechanic shall have work, the situation is simply a notification to outside capital that it comes in at its own peril. The record of the unions in the old San Francisco was bad enough. But then capital was already planted and could not help itself. There could scarcely be greater folly than that of the unions to-day in practically announcing that the new estate is to be worse than the first.

Architecture of the Old North Church.

Who was the architect of the Old North Church at Boston, Mass.? The architectural profession has come to the conclusion that the design points to Sir Christopher Wren of London, but, writes Williard French in the *Architectural Record Magazine*, while Sir Christopher did many magnanimous things it is hardly probable that he presented the plans to the embryo parish with the condition that the fact and his connection with them be kept a secret, only to creep into legendary lore in ages unborn. But here is an explanation that explains, and I hold it in firm faith as the truth, the whole truth, and nothing but the truth: The Old North Church is identical with St. Anne's, Blackfriars, England. St. Anne's is one of the ideal miniatures wrought by Sir Christopher Wren. It antedates the Old North not many years, and two members of the original Old North parish came from St. Anne's parish, Blackfriars, England, over to the New World. There is much evidence extant that members of the North End clique were not overscrupulous about some little things in those great days, and I think it only requires the facts—which of course can never be obtained—to add the surreptitious borrowing of the plans of St. Anne's for the North Church of Boston. So much of glory has hung about the church as the holder of the spire that held the lanterns for Paul Revere that the rest has been neglected. But I believe it to be a fact—a most important fact, too—that we have, right in the Hub, one of the finest examples of Sir Christopher Wren's mastery in architecture. To save the fee our worthy sires secreted the fact; therefore there is no record.

Portable houses, it is stated, will probably be in considerable demand in the near future in connection with the construction of the Panama Canal. There is not sufficient lumber nor carpenters to meet the demand for building frame houses, so that it is felt that it would be well for manufacturers of portable buildings to make an effort to foster the market by communicating with business houses at Colon.

New Office Building of United States Express Company

(With Supplemental Plate.)

One of our supplemental plates this month represents a view of the new office building of the United States Express Company at Rector street and Trinity place, New York City, and for which Clinton & Russell are the architects. The picture shows the building in process of erection, the steel framework having been practically completed and the encasing masonry carried up to a hight of ten stories. The building is 23 stories in hight; covers an area of about 18,000 square feet and has an exterior of brick, stone and terra cotta, the latter being used for trimmings and also in the form of square tile as a veneer for the front, as shown in the picture. Immediately in the foreground are the tracks of the Manhattan Elevated Railroad with the station at Rector street, which conceals the two lower stories of the building. For this reason it does not have in the picture the apparent hight it otherwise would. In building the encasing masonry swinging scaffolds were used, these being suspended from projections at different intervals, something after the manner of the plan adopted by painters. An examination of the picture shows the projecting supports at the floor line of the 17th story, the ropes being clearly indicated at the left and also at the right of the building, while at the front they are indistinctly shown supporting the scaffolding upon which the men are at work.

The general contractors are the Thompson-Starrett Company, while the foundation work was done by the Foundation Company, both of New York City.

Convention of Concrete Block Machine Manufacturers' Association.

Announcement has been made by Secretary S. L. Wiltse that the second annual convention of the Concrete Block Machine Manufacturers' Association of the United States, will be held at Detroit, Mich., August 8 and 9. He urges all members to be present, as this is to be a very important gathering and each member will have an opportunity of expressing his views in behalf of the concrete block and brick industry. An excellent programme has been arranged, papers will be read and discussed and the meeting will, from an educational standpoint, be of great interest to all engaged in the business. The secretary points out that the association has done much good in the past year and that "progress" is the watchword of the future.

"Carpentry and Building" in the San Francisco Disaster.

We have in the past received a number of letters from practical readers testifying to the value of *Carpentry and Building* as a trade journal and the esteem in which it was held by those not only actively engaged in the building business, but by those who subscribed to it simply for the interest which they took in the matter appearing in its columns. Without doubt the most gratifying testimonial which has come to our desk, is a communication just received from Dennis Campbell of the firm of Mark Campbell & Son, carpenters and builders, 729 Webster street, San Francisco, Cal. Under recent date he says: "Although I lost almost everything I had by the fire, I managed to save all the copies of *Carpentry and Building*, which at the last moment I buried in a hole in the back yard, and after two weeks dug them up unharmed."

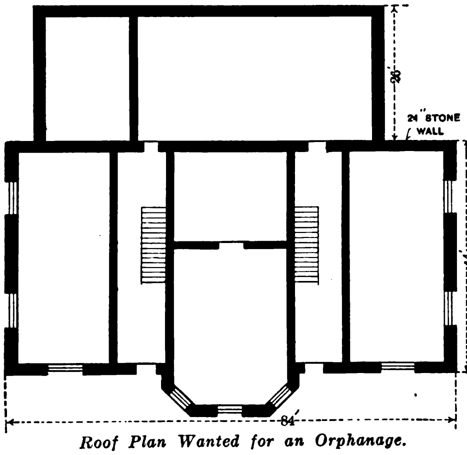
CORRESPONDENCE

Roof Plan Wanted for an Orphanage.

From W. H. G., *Crescent, N. C.*—I inclose a plan for an orphanage which is to be two stories in hight, with a 24-in. stone wall the same hight all around. I would like very much indeed to hear from some of the practical readers as to the best plan for a roof showing the framing, both wood and steel. The roof will probably be covered with slate or metal shingles.

Short Cuts in Estimating Heating Work.

From C. W., *Wilmington, Del.*—I have read the letter of "R. B. M." in the February issue and would advise all who have not been qualified by experience to judge of the value of short cuts in estimating to be very careful of their use. I listened to a very interesting conversation recently between two men, one who did not believe in short cuts, and the other who conducted a large business and found the necessity of occasionally giving an estimate when there was not sufficient time to make an item by item computation of the possible cost. Apparently this man had given considerable time and thought to the provision of some reasonably accurate short cut, but stated that he divided buildings to be heated into several different classes. The residence in a block naturally was more easily heated than the residence of similar type exposed on all sides, and a still different condition was presented when the building stood in the suburbs or in the country. These three different types of residence were again subdivided, depending on the character of their construction, whether they were heated throughout and according to the number of stories. Store buildings, churches, halls and other buildings were considered in the same way. By this method when called upon to estimate on the cost of heating a building, either from plan or from a description of it, with its size, there was less guesswork in arriving at a good, close idea of the cost of heating it than if not guided by the type of the building. The arrangement of the building has an important bearing on the pipe work and consequently on the labor of installation.

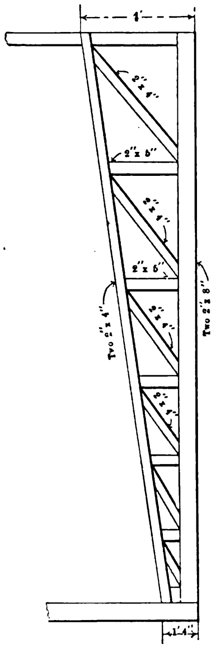


Roof Plan Wanted for an Orphanage.

After having carried out this method for a number of years, with continuous revision, it had been found that the cost could best be arrived at by considering the amount of the radiation. Just as the loss of heat through the equivalent glass surface determines the amount of radiation, so the amount of radiation in different types of buildings will largely govern the cost, providing the cost per foot is arrived at by lumping the entire cost on a number of accurately recorded jobs and dividing this by the number of feet of radiation. This quotient will give a price per foot for radiation for this particular type of building. This method having been used for a great deal of work and an accurate record kept of the cost of each particular job, it was the custom of this man to keep in the back part of his live ledger the name of the man for whom the heating plant was installed and the price per square foot of radiation which the completed job cost. As the result he has tabulated the cost of all his work, and with the aid of these tables for each different class of building is qualified to very quickly judge which of the many pieces of work he had done is nearest like the job on which he is called upon to figure. There seems to be less risk in this man's method than any that has been brought to my attention, and "R. B. M." and other readers will see that he has not arrived at his method without doing a great deal of detailed, laborious work. Those who desire short cuts can do no better than follow his example before arriving at a method for saving time in computing the cost of a proposed piece of work. His custom of keeping an accurate account of the cost of work not only verifies the correctness of his estimates, but also gives him absolutely reliable information on which to base his approximations.

Preventing Purlin Posts in Barns from Springing.

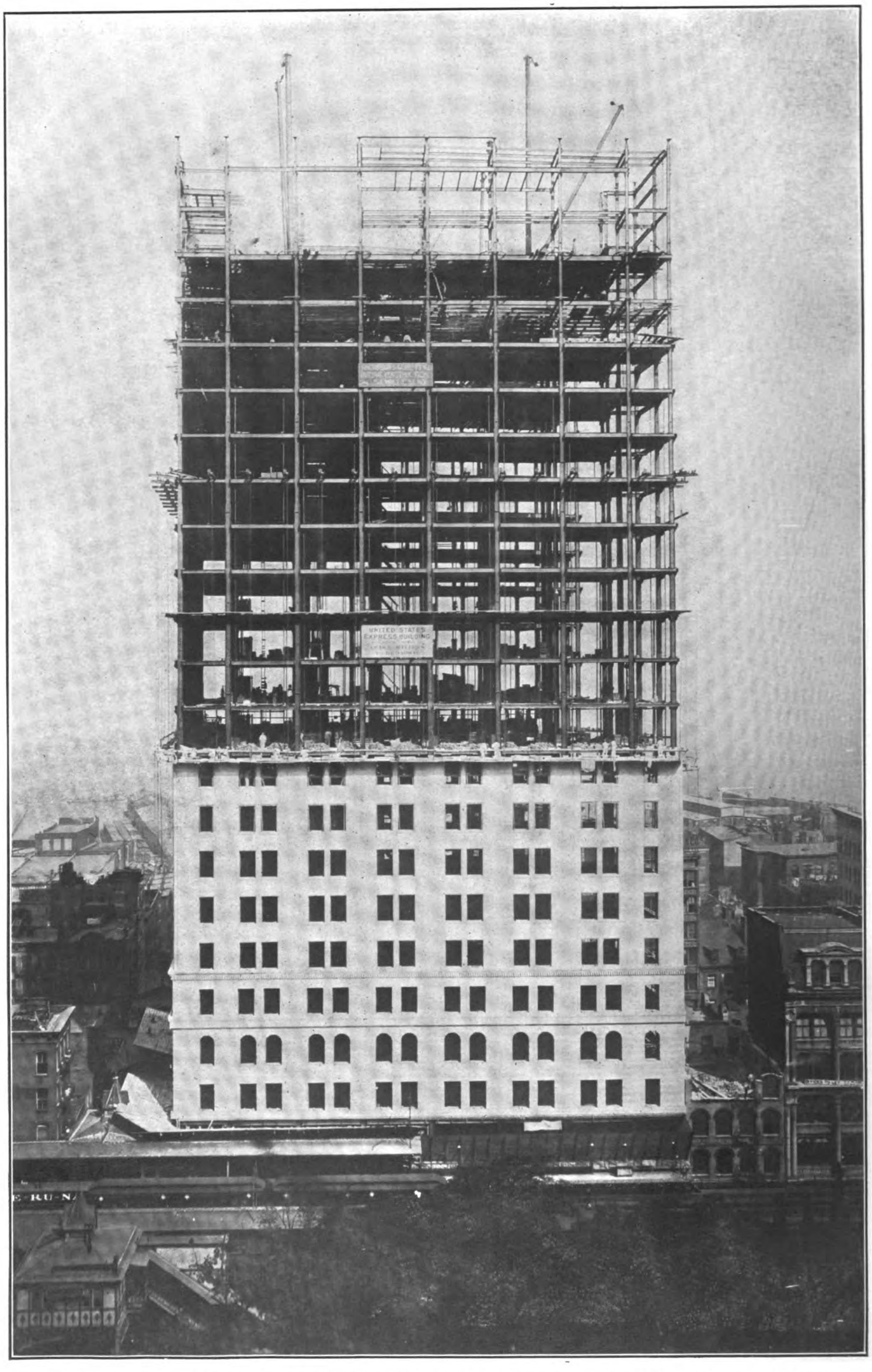
From J. T. W., *Scottsville, N. Y.*—In looking over the April issue of *Carpentry and Building* I noted an inquiry from "V. B.," Smithville, Ont., in regard to the end bents of barns springing out through the pressure of hay and grain. For his benefit and possibly that of others who may be interested I would say that I have used the plan shown in the accompanying sketch for the last ten years and it has proved satisfactory in every respect. It is what is called a truss post. It is made of 2 x 4 and 2 x 8 pieces, disposed as clearly indicated in the sketch. In our gambrel roof barns there is a post in the center of the end bent which runs from the sill to the ridge. This post is located at the point where most of the pressure occurs in the mow, especially where the hay is put into the mow with slings. In concluding these comments I desire to say that *Carpentry and Building* improves every year.



Preventing Purlin Posts in Barns from Springing.

Repairing Cracks in Plastered Walls.

From J. E. R., *Cambria, Va.*—I am a reader of *Carpentry and Building* and have received from its correspondence columns a great deal of help. I now come to



NEW TWENTY-THREE STORY OFFICE BUILDING OF UNITED STATES EXPRESS CO., NEW YORK CITY

CLINTON & RUSSELL, ARCHITECTS

SUPPLEMENT CARPENTRY AND BUILDING, AUGUST 1906

COLONIAL RESIDENCE OF MR. W. L. DOUGLAS, SOUTH EIGHTH STREET, COUNCIL BLUFFS, IOWA

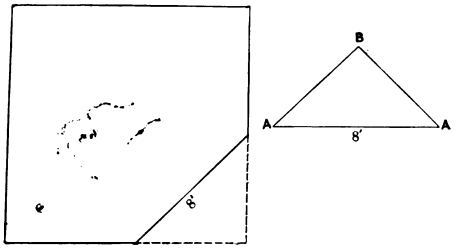
J. C. & W. WOODWARD, ARCHITECTS

SUPPLEMENT CARPENTRY AND BUILDING, AUGUST, 1906

ask some of the experienced chips to tell me the best method and the best materials to use for repairing cracks in plastered walls—something that will finish up nicely with the material on the wall and will also adhere to it.

Method of Cutting a Corner.

From C. W., *Mount Vernon, Ohio.*—I have often noticed the suggestion in the Correspondence Department that readers of the paper forward any kinks or wrinkles which might possibly be of interest to those engaged in the building business, and I therefore take this opportunity of inclosing a drawing showing my method of readily cutting a corner to a stated size. Suppose, for example, it is desired to have the corner measure 8 ft. across, as indicated in the larger diagram. Now it is only necessary to make a triangle with a base of 8 ft. and then draw two lines at an angle of 45 degrees, as A B and A B. The intersection of these lines will form the triangle, as indicated in the smaller diagram. Now take the distance A B and we have the exact measurement across the corner. There are several ways of accomplishing the same thing, but the plan I describe is the most convenient, so far as I know.



Method of Cutting a Corner.

Acknowledgment of Answers to Inquiries.

From J. E. N., *Leland, Ill.*—I like *Carpentry and Building* very much, especially its correspondence columns. I heartily agree with "Hee H. See" that we ought to acknowledge answers to inquiries and tell which has benefited us the most. To my inquiry of August, 1905, there has been just one answer, which appeared in the issue for March, and that was good. I desire to thank Mr. Wagner of Port Jarvis, N. Y., for it. I for one would like his ideas regarding gutters set on top of roofs.

I am also indebted to "Hee H. See" for his ideas regarding purlin cuts, which appeared in the issue for June, 1905. All of us young learners ought to be thankful to those wiser heads for being willing to answer our inquiries. It is not every one who is willing to part with his knowledge gratuitously, for many there are who evidently want to keep us in ignorance of many things connected with the trade with which we are not at present familiar.

Shingling a Valley Without Flashings.

From H. M. S., *Winsted, Conn.*—In reply to the inquiry of "T. B.," Toronto, Canada, published a short time ago, I send a sketch showing my method of shingling a valley without flashings. The sketch so fully explains itself that I feel sure the correspondent can do the work satisfactorily without further comment. The whole secret is to make every shingle fit onto the one below it, but if the correspondent will take pains in doing the work it will make a better valley than where tin is used.

Methods of Rapid Shingling.

From H. H. PALMER, *Warehouse Point, Conn.*—I am very much interested in the correspondence that appears in *Carpentry and Building* touching the question of "Rapid Shingling," and especially in the methods for doing the work. I have often thought I would like something in the line of a gauge and the one on the hatchet of "Western Builder" would be all right if it will work with entire satisfaction. In regard to this matter I would like to ask "Western Builder" a few questions. Does the gauge on the hatchet interfere with its use in splitting, hewing and trimming shingles. As a hatchet is about 6¼ inches long and we often lay 18 inch shingles 5¾ inches to the weather, it will bring the gauge very near to the cutting edge of the hatchet, which would be quite different from the picture on page 57 of the February issue.

Will the three-cornered seat hold firmly on a roof of 12 inches to the foot pitch? Would it be necessary to have two seats for such a roof?

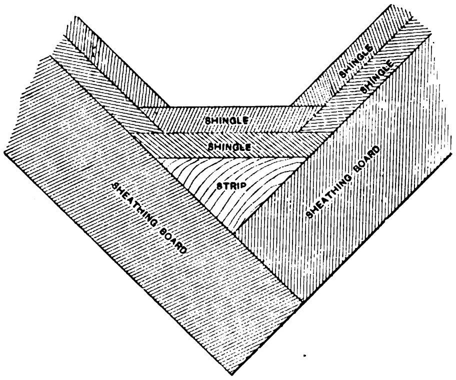
Roofs in this vicinity run from 6 to 12 inches to the foot. Would it be best to have seats for each pitch, or will one do for two or three different pitches?

These questions have occurred to me while thinking of the matter and I submit them in order to obtain further information.

Note.—We submitted the above questions to "Western Builder," who furnishes the following comments in reply:

I have the inquiry of the correspondent asking if the gauge on a shingling hatchet interferes with trimming the shingles. In reply, I would say that any gauge attached to the hatchet will interfere to some extent with trimming. In actual practice we have found that the roof is better if the shingles are laid slightly open, which prevents buckling when the shingles swell up after a rain, and this leaves trimming necessary only where shingles join at the finishing of the course. I am aware that this will not meet the approval of some, who still hold that every shingle should have both edges trimmed square with the butt, but I do not find their sort of roof lasting any longer than ours, nor does it look any better from the ground.

As to the stool, it will be found better to have it pitch so as to set level on the roof; it is quickly made out of scraps of lumber, and one can afford to make a new set for each roof if necessary. I should always advise having two stools for a steep roof, as it makes getting about over the roof much easier. We have no trouble in working on roofs of half pitch or even steeper.



Shingling a Valley Without Flashings.

I am under obligations to "C. B. J." of Oregon City, Ore., for his letter in the June issue. He will probably receive his share of criticism, but if it encourages any one to move over the next roof a little faster his suffering will be in a good cause.

I think that all the advocates of more rapid methods of work are misunderstood by a majority of the readers. It is not a question of every carpenter laying 10,000 shingles a day because some expert has done the like, but rather a question as to the possibility of the average man adopting the methods of the expert and by so doing make a material addition to the value of his output. I am not disposed to decry the value of the average man, but I am frank to say that I would rather have a man who will nail 4000 shingles a day than two men who would nail but 2000 each, or a man that will trim ten openings or hang eight doors in eight hours rather than

two men who could together do only as much work as the one.

I gather from the progress of this controversy that there is a large class of readers who are fairly aching to give preference to the slowest men they can find. I hope they will find all they want of this sort. Should they have any difficulty in finding a sufficient supply I will be very glad to tell them where they can find a liberal supply of the sort of mechanics who are willing to work slowly enough to satisfy the most exacting advocate of the "good old methods."

Handrail for Well Hole at Top of Straight Flight of Stairs.

From MORRIS WILLIAMS.—In the July issue one calling himself "Subscriber," wishes to have the above problem solved with as few lines as possible, and to know if the bevel can be obtained direct from the pitchboard.

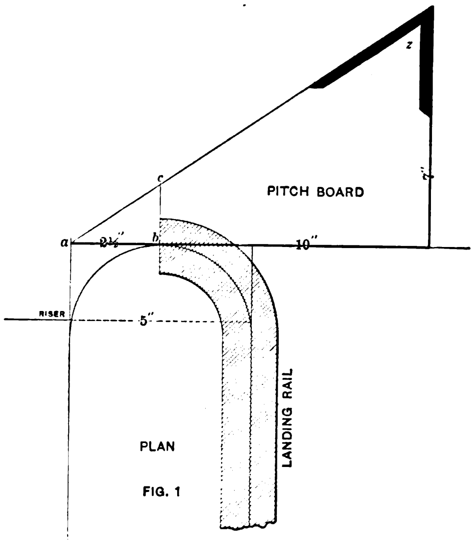


FIG. 1

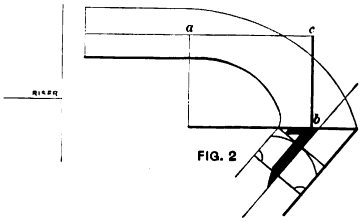


FIG. 2

Fig. 1.—Plan of Small Cylinder Placed at Top of Straight Flight Connecting with the Landing Rail.
Fig. 2.—Face Mold and Bevel Applied, Showing How to Finish the Wreath.

Handrail for Well Hole at Top of Straight Flight of Stairs.

I submit the accompanying diagrams for his consideration. Fig. 1 represents the plan of a small well hole having a 2½-in. radius between the center of the rails. Upon the crown tangents is placed the pitchboard, as shown, and upon *b* a perpendicular line, *b c*, is erected to cut the long edge of the pitchboard in *c*. The shaded portion in this diagram represents the landing rail, which coincides with the plan rail.

In Fig. 2 is indicated the manner of drawing the face mold. Make *a c* equal in length to *a c* of Fig. 1 and *b c* equal to *a b* of Fig. 1, which represents the radius of the well hole—namely, 2½ in. At *a* make the width equal to that of the plan rail and at *b* about ¾ in. wider. Apply the bevel at *b*, as shown, holding it parallel with the joint and in the direction of the outside of the wreath. The bevel is the one shown at *z* of Fig. 1, and as there shown it is composed of the upper angle of the pitch board. With these comments I feel sure the correspondent in question will readily understand the method of doing the work.

What Material is Best for Roof Covering?

From W. T., *Richmond, Va.*—We have to cover the roof of a building erected of concrete and steel and have provided for covering it with tin, as our customer prefers. It has been suggested, however, that there will be condensation under the tin and that it will be better to cover the roof with some other material. One of the officers of the company for which we are to do the work has requested us to secure further information before we finally select the roofing material. We will be glad of any information which we may receive.

Note.—Doubtless our readers can give some valuable information to this correspondent. In the meantime we would suggest that the use to which the building is to be put will have a bearing on the character of roof covering to be selected. If it is a manufacturing building in which steam is given off or fumes accompany the processes of manufacture there is likely to be considerable condensation, and unless precaution is taken to prevent this moist atmosphere from coming in contact with the tin it will have a destructive effect. If this is an ordinary business building for storage purposes or business purposes there is no reason why a good tin roof will not answer the purpose.

We would point out, however, that apparently too little attention is paid to the character of the sheathing boards under tin roofs at the present day, and also to the pitch which should be given to a tin roof. If planed tongued and grooved sheathing boards are used there is little possibility of the air under the roof penetrating to the under side of the tin. If these boards are in good condition and the roof is smooth there will be no uneven places to cause the tin to wear from the rubbing contact with it which comes from expansion and contraction and other causes. If a guaranteed plate with a sufficient coating to protect it is then properly applied to the roof there is every reason to expect that it will prove serviceable for a long period. The roof framing, however, should provide for a sufficient pitch to have the water run off the roof promptly and not allow it to stand in flat places until it is disposed of by evaporation. This is rather severe treatment for metal, however well coated or however well painted it may be.

A Method of Hanging Doors.

From P. C. D., *Fryeburg, Me.*—Thinking it may interest some of the readers of the paper I will describe a method of hanging doors which I consider about right. With a straight edge try the hinge side of the door frame and if it is true joint the hinge side of the door; try it with the straight edge to see if it is right and if the frame is square cut the top of the door square. With a thin batten take the width of the frame top and bottom and lay off on the door. Join the two points with the straight edge and joint to the mark, making a little allowance for clearing and making the lock edge a bit beveling. Have ready another strip about ¼ inch thick and 1½ inches wide and the length of the door. Mark off the hinges on the edge and with this lay off the hinges on both door and frame.

In setting the hinges I gauge from the rabbet side of the door frame with a "Plants" door hangers' gauge. It isn't a beauty, but it is serviceable. Cut in the hinges and set the door swinging. I will say right here that setting a door frame should never be slighted. It should be set as nearly straight, plumb, square and out of wind as possible.

Cutting in a threshold used to bother me a great deal until I tried the following method: Take a piece of board five or six inches wide and about three feet long. Place it across the door frame and with a try square take the lengths and bevels onto the board. Place the threshold in front of the board and with the square transfer to it the lengths and bevels. If carefully done a good fit will result every time. I never was a rusher, but was always willing to adopt any plan that promised better work or a saving of time if not at the expense of the quality.

Censorship of Correspondence.

From HEE H. SEE, *Brockville, Ont.*—Referring to the letter of "P. C. D." in the June issue of the paper, I wish to say that I am quite at one with him in thinking that "we can trust the editor to make corrections in such a way that the writer will not feel hurt," and it is just for this reason that I wish this business of censorship to be left in his hands.

Setting Mantels and Porch Columns.

From J. E. R., *Cambria, Va.*—Will some of the experienced readers who may feel so disposed tell me how they set and fit porch columns, also how they set manufactured mantels and the best method of fastening them in place? I would appreciate very much detailed information on these points, as I feel that others would be helped thereby.

Amount of Stain Required Per 1000 Shingles.

From OLD READER, *Wheeling, W. Va.*—Will some of the readers who have had experience tell me through the correspondence columns the amount of stain or oil required per thousand for dipping shingles, also what is the quantity required to coat them after they have been put on the roof.

Note.—Experience may show varying results in matters of this kind, but in using, for example, the Creosote shingle stains made by Samuel Cabot of Boston, it is suggested that from 2½ to 2¾ gal. will suffice for dipping 1000 shingles and that for dipping and applying one brush coat after the shingles are laid, 3 gal. for each 1000 shingles will answer the purpose. It is pointed out that only two-thirds the length of the shingle need be dipped, and that if the stain is applied with a brush, two coats should be used. With all this said, however, we shall be glad to have our readers express their views in the light of their own experience.

A Satisfactory Folding Miter Box Wanted.

From J. B., *Leonardville, Kansas.*—I would like to have readers of the paper, who have had experience with folding miter boxes, to name which, in their opinion, is the most satisfactory for general use. I want a box that can be folded together so as to occupy small space in the tool chest. I have used one make of folding miter box, but it was not at all satisfactory.

Fastening Sash Cord to the Sash.

From HEE H. SEE, *Brockville, Ont.*—I might say in answer to the correspondents who are asking for a knot for fastening the end of a sash cord to the sash, that I think it is next to impossible to do this with a knot alone on account of the poor facilities afforded by the maker of the sash. In order to be sure that a knot tied in stiff braided cord like sash cord, will hold it is necessary to have from 2 to 3 in. of an end left beyond the knot, and room for this the sash maker does not provide.

The writer has hung a large number of sash in his time, including some that were so heavy, owing to having been glazed with plate and leaded glass, that we had to use square lead weights in place of round cast iron, in order to get room enough in the boxes. The cords started to break in about a month and had to be taken out and replaced with chains, but neither the knot used at the weight nor the fastening at the sash gave way.

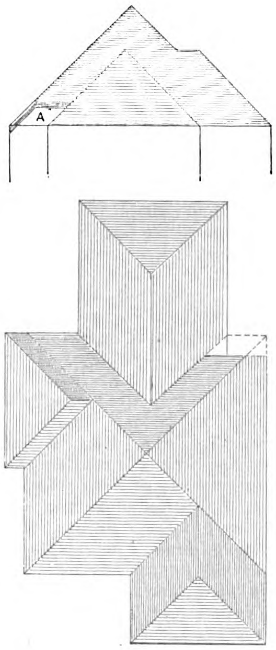
The knot used at the weight I have already shown, and for the sash fastening I tie an ordinary round knot or, if there is room, a figure eight knot, leaving a couple of inches of cord beyond the knot and drive it into the hole provided for it, being careful to have the end come out at the bottom of the hole. I then drive a 1½-in. shingle nail into this end close up to the knot and cut off the end close to the nail.

Hanging Inside Blinds.

From L. B. F., *Danville, Va.*—Will some of the readers who have had experience in making inside blinds tell me how to cut them in two so as to keep them from dragging each other when opening and shutting them. My method is to hang them up and with a straight edge mark them; then remove the blinds and cut them. Sometimes they will not drag, but in the majority of cases they do, and I want some one to tell me of a better way of doing the work.

Roof Plan for "J. C. L."

From P. C. D., *Fryeburg, Maine.*—I inclose sketches which may be of some use to "J. C. L.," Hammond, Ind. One shows a plan of the roof and the other the rear elevation. An inspection of the latter shows a part of the wall built up to hold the hip rafter, or if there is no reason why he should not he can extend the plates and cornice, as indicated by the dotted lines on the plan. Then the finish will go round on a level. The space A on the rear elevation is boarded and clapboarded.



Roof Plan for "J. C. L."

Disadvantages of Subcontracting.

From H. A., *Cincinnati, Ohio.*—The question often comes up as to whether it is preferable to do work for the owner or a contractor, and I desire to express the opinion that every argument is in favor of doing work for the owner. With very few exceptions, contractors are doing business on the capital of their subcontractors, and a very large part of them have very little backing in proportion to the amount of business they transact; so that the man doing work for the contractor, instead of for the owner direct, multiplies his chances of losing his money. If the work is done for the owner there is no chance to lose the money, except the owner should have his property tied up with liens or covered by mortgages. It is easy to find out if the latter has been done, and the former is seldom done by a contractor dealing direct with the owner, most of the liens that are filed being filed on account of a subcontractor or a material man. In case of the owner failing to pay, it is a practical certainty that the contractor will not pay, so that the subcontractor is sure to lose. In fact, many contractors make all their contracts contingent upon payments being made as the money is received from the owner, and they often willfully delay completing a contract because they have held back so much of their subcontractors' money that the balance from the owner is less than the amount withheld from the subcontractors.

Another reason why it is better to contract with the owner is that he is much less apt to "go broke" than the contractor.

A third reason is that if a contract is taken from a contractor it means that the owner must pay more for the same work, or that the subcontractor must take less for the same work, as one of these two parties, and sometimes both, must pay the contractor a profit for handling the business.

A fourth reason is that, if a question arises whether the specifications require a certain kind of fixture, the general contractor, having nothing at stake, because his contract requires the subcontractor to do everything under that contract that he (the general contractor) may be compelled to do in that particular line, nearly always, regardless of right and justice, sides with the owner, because by so doing in that particular instance, he can obtain concessions from the owner on the branches of the work that he happens to be executing himself. In this way he practically abstracts money from the pocket of the subcontractor and puts it into his own.

A fifth reason is that payments are not so prompt where the work is done for a contractor, as some delay in a branch of his work causes him to wait a week or two before asking for a payment on the contract. And then there is often an unexplained delay before he receives the money from the owner, and still another delay before it dribbles through to the subcontractor. Cases have been known where a contractor has had the subcontractors' money in bank for months to his own credit, while he was making various pleas to them that he was unable to obtain a payment from the owner. These are not exceptional cases. It is the rule with contractors—with some notable exceptions, of course—to make no payments on a job except from money they have secured on that job.

A sixth reason is that delay is often caused by a clause in the subcontractor's contract that allows a certain percentage—sometimes as much as 25 per cent.—to be held up until the building is completed. Then, if there is a delay of a year or two, the subcontractor's money is held up, through no fault of his, except that he was fool enough to sign such a contract. The writer knows of a $15,000 contract which has been completed for nearly a year, except for about $150 worth of work, which cannot be finished for some time, because the contractors have allowed (intentionally or otherwise) other subcontractors to be dilatory in getting out of the way of the plumber, who has been ready, willing and anxious for months to complete his work, but cannot do so on this account. Thus $3000 of his money is held up unjustly and he has no redress; whereas, if his contract had been with the owner, he would have had his money months ago.

All these six reasons are *bona fide* ones and each of them is sufficient to make it inadvisable to subcontract work if it is possible to get it from the owner direct. As to the advantages of contracting with a contractor instead of an owner, the writer is frank to admit that an experience of nearly 20 years in the building business has failed to disclose to him a single reason why it is sensible, fair or just to deal with a contractor if it is possible to make a contract with the owner. It is a vicious and foolish practice and should be stopped. Every branch in the building business should be so thoroughly organized that the members would refuse to figure on any work except to the owner direct. Then the architects would earn their money, the owner would get better work, it would be done more promptly, and the subcontractor would have a fighting chance to make a living.

Finding the Capacity of Tapering Tanks.

From R. T. V., *Terre Haute, Ind.*—In the January issue of the paper "T. M." gives an incorrect method of finding the cubic contents of tapering tanks. Several correspondents have noticed the error and attempted to correct it. Most of these vary in the results obtained and in the rules used; hence it may be of interest to know which rule and answer is correct.

The answer and method given by "E. B. N." in the March issue is correct, as is also the method given by "C. T. B." in the same number, but there is a very slight error in the latter's calculation due to the fact that he employed the figures 7.48 as the number of gallons in one cubic foot. For all practical purposes this is sufficiently correct, but the result would be more accurate if the number 7.4805 + was used or if the number of cubic feet was multiplied by 1728 and the result divided by 231.

The rule given by "C. E. B." in the July issue is not correct, although it gives results somewhat better than the rule of "T. M." The correspondent "C. E. B." makes the mistake of squaring the average diameter and multiplying this by the hight to obtain the cubical contents. His fraction $^{11}/_{14}$ which he uses for squaring the circle is also only approximately correct.

The method I use in computing the capacity of a tapering tank, such as the one in question, is this: Add together the squares of the diameters of the two ends and the product of the two diameters, multiply the sum by 0.7854 and this product by the hight and then divide this last product by 3. This gives 288,172.6848 cu. in., which divided by 231 gives 1,247.5008 gal.

An All-Steel Office Building.

One of the results of the terrible conflagration which practically wiped out the city of San Francisco is the erection upon one of its main thoroughfares of what is probably the first all-steel office building in the world. It is to be 15 stories in hight, with a mezzanine floor and a deep basement. The framework is being walled in with steel plates riveted on steel ribs something after the style in which a battleship is sheathed. The different floors are not to be partitioned until the prospective tenants have selected the areas requisite to their needs.

The new structure is to be known as the George Whittell Building, and the architect is Frank Shea. The progress of the work is being watched with the deepest interest by architects and builders all over the country, as it is felt that this type of structure, if successful, will create a revolution in methods now being employed in the building world.

Totin' the Hod.

When I near some houses building,
  With all sorts of stuff around—
Lime and sand and bricks and lumber,
  Dumped upon the uneven ground;
When I see the bed of mortar,
  With a pile all tempered right,
When I see the man that's tending,
  As he works with all his might—
Fills the hod to overflowing,
  Stoops and shoulders it, and then
Mounts the steps or climbs the ladder
  To supply the workingmen;
I don't think of town improvements,
  Nor of scanty, well-earned pelf,
But there comes a kindly feeling—
  For I've "toted" some myself.

Once again I hear the clinking
  Of the trowel on the wall.
Once again I see the sunshine
  On the blinding whiteness fall
Of the lime within the slush-box—
  Watch it crack and hear it boil;
From its rattling detonations
  I can feel myself recoil.
But all these—I pass them over,
  As I watch him with his hoe,
See him load his empty hod up,
  Then into the building go.
But it's not of town improvements,
  Nor of scanty, well-earned pelf,
It's of former days I'm thinking,
  When I "toted" some myself.

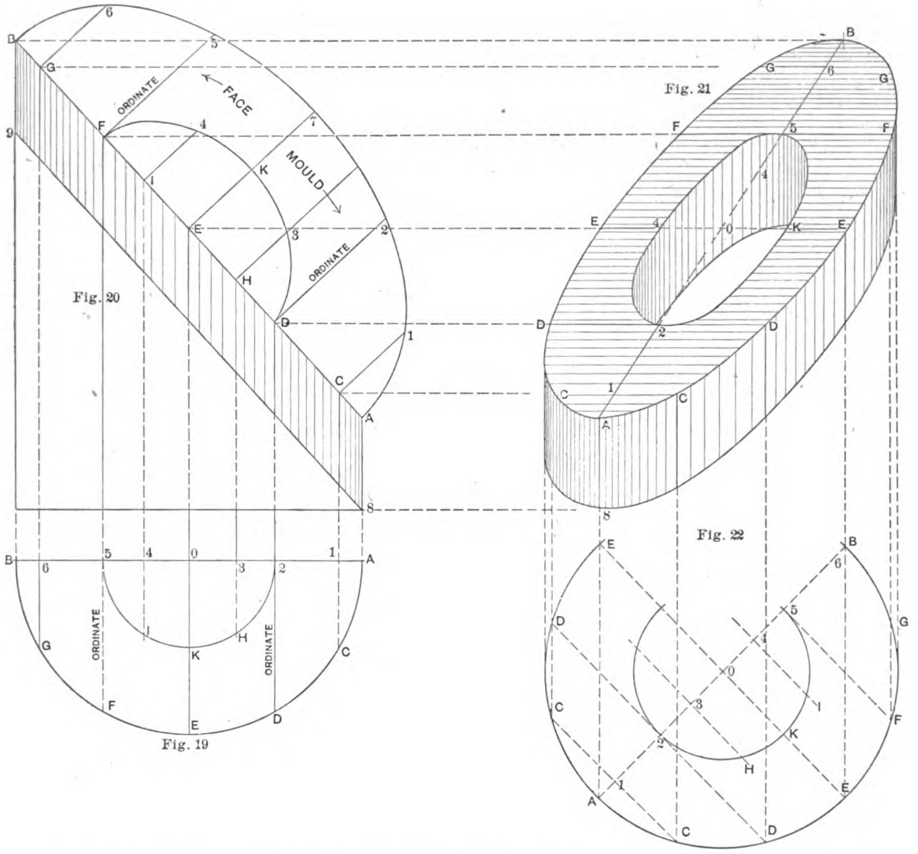
And I think, as I am looking,
  If I'd never helped to do
Work that strained and stretched each muscle—
  Gave me soreness through and through—
I had never felt this feeling,
  Kindly, thoughtful, for the man
Who with hod and hoe and shovel,
  Travels in improvement's van.
So you must not count me foolish,
  And perhaps a trifle odd,
If I stop and hold some converse
  With the man beneath the hod.
For you'd have a kindly feeling,
  Far removed from paltry pelf,
Far removed from town improvements,
  If you'd "toted" some yourself.

—John L. Shroy.

CENTERS FOR ARCHES OF DOUBLE CURVATURE.*—VII.

By Charles H. Fox.

THE development of the curves referred to in the last issue is founded upon the well-known geometrical principle that if a cylinder be cut in any direction except parallel with its axis, that section will be an ellipse; if cut parallel with its axis the section will be a rectangle, and if cut parallel with its base—that is, at right angles to its rectilinear elements—the section will be a circle. We shall in the construction of the diagrams shown in Figs. 19, 20, 21 and 22 explain the practical application of this principle. We may suppose a hollow cylinder similar to that represented in the diagrams to be cut by an oblique plane, of which the line A B of Fig. 20 is the vertical projection; the section formed will be bounded by two proportional ellipses, consequently the section will be at its greatest breadth at each extremity of the greater axis A B, and at its least breadth at each extremity of its lesser axis, represented by E E' of Fig. 21. Therefore, if a quarter of a ellipse similar to that which obtains in the faces of the plank represented in the diagrams of Fig. 18 be considered there will be a continual increase of breadth from the extreme of the lesser axis F 3 or F 8 to that of the greater axis F 10 or F D.



Figs. 19-22.—Diagrams Illustrating the Method by Means of Which "Face Molds" May Be Developed.

Centers for Arches of Double Curvature.—VII.

In the development of the face and falling molds made use of in these studies those required not only to give the direction for forming the cylindrical surfaces which belong to the soffit and exterior bounding surfaces of the cylindro-cylindric arch, but also those required for giving the direction for forming the cylindrical surfaces which belong to the convex and concave faces of the cylindro-conic and radiant arches will be considered. We assume the cylindrical surfaces in question to be cut or intersected with oblique planes. That this obtains may be seen by a moment's consideration, for we know that the oblique plane which forms the top of the model has in practice also to intersect the cylindrical surfaces of the two faces of the head or sash. In the forming of the finished solid of the head or sash, which may belong to the latter mentioned forms of arch, we have no choice in the method of working or squaring up of the plank. The cylindrical surfaces of the faces must be those first formed. To obtain the direction for forming these surfaces, face molds similar in construction to those given in the diagrams of Fig. 20 are developed; and the contour as given by these molds are transferred to the oblique surfaces which form the top and under sides of the plank. Then, having formed the cylindrical surfaces, other molds are applied to these surfaces in their proper positions, and from or to their direction may the other surfaces of the head or sash be formed.

Owing to the fact that each of the four bounding surfaces of the cylindro-cylindric arch are cylindrical, we have the choice of two methods of forming the finished solid of the sash. We first form the surfaces of the convex and concave faces, or form the surfaces of the soffit and exterior. No matter which plan may be followed, the contour of the directing curves are elliptical and may be developed by the method to be now explained. Having drawn the plan as in Fig. 19, draw the diameter A B. Then divide the curve into any number of equal

---

parts, as shown in A C D, &c., of the diagram. From each point square with A B produce lines indefinitely. Now, assuming the line A B of Fig. 20 at pleasure from each point as A C D, &c., at which the lines drawn from the plan have intercepted the line, square with A B, draw lines as shown. Now set off C 1, D 2, H 3, &c., equal to the length of the corresponding projections as given at the plan, and through the points obtained in A 1 2 7, &c., trace a curve and the true form of the section at the oblique line A B may be obtained.

For the purpose of these chapters the projection of only one-half of the section is sufficient, for it is obvious that the other half may be obtained in a similar manner. The method just explained, by means of which the true section may be developed, is called the "ordinate method." In the construction the section is supposed to revolve around the axis line A B until the true section is brought to view. The lines 1 C, 3 H &c., of the plan are called "plan ordinates"; those drawn at the corresponding projections of the section plane are called "ordinates of the section plane." The projections in question are those given by the intersection of the cylinder with auxiliary vertical planes similar to those projected in the diagrams, Figs. 13 to 17. The projections given on the plan are the horizontal traces, those given on the elevations are the vertical traces, of the planes in question. As the planes intersect the cylinder in a direction at right angles to that of the axis A B of the section plane, they intersect that plane in level lines. This gives to the ordinates that property of being equal in length to that of their horizontal traces. It is by means of this property that we are enabled to construct the section given at the oblique plane so readily. Understanding clearly the principles of construction here developed, no difficulty will be experienced in apprehending the method of construction employed in developing these curves under the head of "Face Molds."

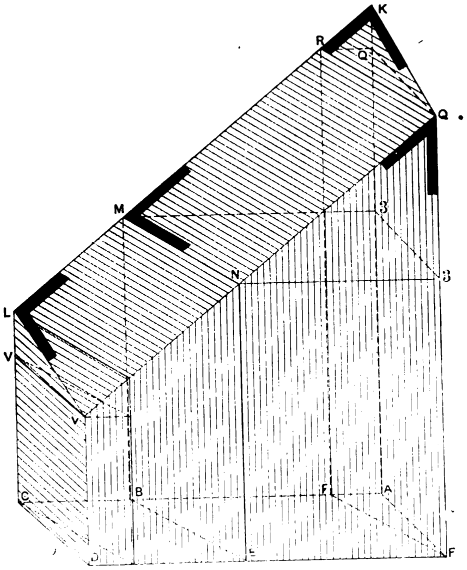


Fig. 23.—Elevation of Cardboard Model of Fig. 18.

Centers for Arches of Double Curvature.—VIII.

In Fig. 23 is shown an oblique elevation of the model of Fig. 18; letters of reference correspond to those employed at the corresponding points of the model.

◆

The church known as the Broadway Tabernacle and located for so many years at the corner of Broadway and Thirty-fourth street, New York City, has just been demolished, in order to prepare the site for the foundations of an 11-story, basement and subbasement, office building, which will cost in the neighborhood of $1,000,000. The building will front 99 ft. on Broadway and 150½ ft. on Thirty-fourth street, with an "L" extending through to Thirty-fifth street with a frontage of 53 ft. The façade of handsome design, will be of Indiana limestone, with two end entrances adorned with porches and columns.

Building Mechanics in San Francisco.

In discussing the number of men employed in the reconstruction of San Francisco a recent issue of the *Chronicle* states that, according to conservative estimates, there were the first week in June 20,000, divided into 17,000 mechanics and 3000 laborers. Every indication pointed to daily increase of this number as fire losses were adjusted and materials obtained in sufficient quantities. The men were classified as follows:

Carpenters	7,000
Bricklayers	500
Hod carriers	400
Plasterers	400
Cement workers	500
Electrical workers, inside electricians	400
Electrical workers, linemen	500
Elevator constructors	100
Bridge and structural iron workers	300
Building material team drivers	600
Glass workers	200
Housesmiths	400
Hoisting engineers	75
Laborers	2,000
Painters	400
Paper hangers	600
Sign writers	200
Metal roofers	250
Felt and composition roofers	150
Shinglers	100
Marble cutters and finishers	250
Wood, wire and metal lathers	200
Stationary engineers	300
Millmen	500
Varnishers and polishers	200
Plumbers	400
Estimated miscellaneous trades not reported	2,975
Total employed in reconstruction work June 9	20,000

The demand for carpenters continues, and new arrivals find work upon reaching town. First-class mechanics, especially inside finishers, are at a premium, and contractors have placed orders at the headquarters of the council for more men. Every bricklayer in town is at work, and working overtime. The clearing of building sites and the arrival of material will vastly increase the demand for mechanics in the building trades.

◆

Convention of Sheet Metal Workers

The second annual convention of the National Association of Master Sheet Metal Workers will be held, as already stated, at the Hotel Denison, Indianapolis, Ind., August 8 and 9. Secretary W. H. Barnard has issued an invitation to all master sheet metal workers assuring them of a welcome, whether or not they are members of the association.

It is expected that the convention will be a very interesting one with the reports of the various officers, nevertheless, Secretary Barnard has invited the members to prepare papers on the following subjects, so that they may be read and discussed for the benefit of the trade.

The Apprentice Boy.—His future good to employer and how he should be best treated for their mutual good. At what age should he begin and what should be his qualifications and limitations.

The Open Shop.—How it has worked and its prospects.

Hot Air Heating and Ventilating.—Why the use of such systems should be encouraged, particularly in homes and schools, and advice to be given to contractors for this class of work.

A Systematic Method of Keeping Track of Work Done in Job Shops.

The Best Materials for Valleys and Cornice Gutters and How They Should Be Laid.

What Material for Roof Covering Should the Roofing Contractor Recommend?

The secretary states that no better service can be rendered than to make a written memorandum of such recommendations or resolutions as will be beneficial to the trade, and which should receive the consideration of the convention. Such preparation will go far toward making the convention more interesting and the association more useful. Secretary Barnard has spared no effort to bring to the attention of the whole trade those things which, if carefully considered, will make the invitation to the second annual convention well worth accepting.

WHAT BUILDERS ARE DOING.

THERE has been considerable activity in Albuquerque, N. M., the present year, covering all classes of work. There have been about 30 first-class residences, of brick, stone and cement; three new business blocks, one of which is three and one four stories high. The telephone company's new building is about half done. Additions and alterations to old buildings, to the number of about 20, are in progress or recently done. There are in process of erection at the Territorial University two dormitories, which will be completed in time for the fall session of school. The architects' offices are fairly busy and the only thing unfavorable to the season's work is the masonry work situation. There is no competition in masonry work and this branch of the work is figuring much higher than usual.

Chicago, Ill.

In the face of the high record in building made last year, which, with the exception of 1902, nearly doubled the highest total of any previous year, the first six months of 1906 show a considerable increase over the same period in 1905. During the six months just closed permits were issued for the construction of 5264 buildings, having a frontage of 141,333 ft. and involving a total cost of $36,489,145, against 3651 buildings, with 113,088 ft. of frontage, and costing $30,208,425, a total of 1613 buildings, with 28,245 ft. of frontage, and costing $6,280,720, in favor of the current year. The totals for the half-year period for the past 10 years were:

	Number buildings.	Feet frontage.	Cost.
Half year, 1906	5,264	141,333	$36,489,145
Half year, 1905	3,651	113,088	30,208,425
Half year, 1904	3,292	88,483	18,849,010
Half year, 1903	2,976	82,460	17,028,260
Half year, 1902	3,101	95,555	28,817,105
Half year, 1901	3,145	88,223	17,779,965
Half year, 1900	1,274	33,898	4,536,540
Half year, 1899	2,118	62,222	11,865,260
Half year, 1898	2,082	76,745	10,152,800
Half year, 1897	2,631	65,286	11,049,150

Building during June, this year, exceeded in number and feet frontage all previous records, but was surpassed in value by last year's high record. This is due to the fact that office building construction in 1905 largely swelled the totals. Permits were taken out in June for the construction of 1092 buildings with a frontage of 28,151 ft. and involving a total of cost of $6,491,500, against 731 buildings, 21,386-ft. frontage, and an estimated cost of $7,659,360 in 1905, an increase of 361 buildings, 6765 ft. of frontage and a decrease of $1,167,860 in cost.

Nor does there seem to be any stoppage to the amazing building movement which is now in progress. Plans are under way for continued activity in the construction of flat buildings and dwelling houses and the number of large office buildings and manufactories on the boards of architects predicts a noteworthy six-months' period during the last half of the present year. Among the large buildings which are planned for nearby construction are the large warehousing structures to be built on the North Side by Montgomery Ward & Co. and Sprague, Warner & Co., the former a large mail order house and the latter wholesale grocer. The plant of the mail order house will cost in the neighborhood of a quarter of a million, while that of Sprague, Warner & Co. will represent an outlay of a million. Hannah & Hogg are planning a new hotel building to cost $1,000,000, and the preliminary sketches, as prepared by the architects, Marshall & Fox, indicate a building 20 stories in hight, 90 x 100 ft. A number of mercantile and office structures are also scheduled for early building, costing in the neighborhood of $300,000 to $400,000. Among these of notable mention is a $500,000 building which Mrs. Julia F. Heyworth will erect at the corner of Michigan avenue and Harrison street, and the upper 10 floors of which will comprise the new home of the International Harvester Company. The first floor will be rented to retail merchants and the second, third and fourth floors to lines similar to those of the Harvester Company.

Plans are also being prepared by a local architect for the construction of something like 300 houses at Gary, Ind., for the Illinois Steel Company, which will be occupied by employees of the big steel mills at that place. A new town called Burnham is also to be built just outside of the city limits and on the Indiana State line, and B. J. Fitzgerald of Chicago will shortly have plans prepared for 50 houses to be constructed immediately, this number to be increased to 200 within six months. This building site is in the vicinity of the Western Steel Car & Foundry Company's and other manufacturng plants. Building is also active in other large Western cites, as evidenced by the large amount of work in local architects' offices for such places at St. Louis, Indianapolis, Kansas City, Minneapolis, &c. Butler Brothers, Chicago, are having plans prepared for two large warehouses, one at St. Louis and the other at Minneapolis.

Cincinnati, Ohio.

Conditions are such in and about the city that building operations continue upon a liberal scale, and while the high prices of building material and the cost of labor do not appear to have exerted very much of a check upon the amount of work in progress and in prospect, yet in comparing the value of the improvements for the first six months of this year with the corresponding period of last an appreciable shrinkage is noticeable. For the months of June, however, there is a striking increase over a year ago, the figures of the Building Department showing 361 permits to have been issued, calling for an outlay of $846,000, while in June, 1905, there were 444 permits issued, involving an outlay of $635,760. This gain is due entirely to the increased number of dwellings being erected, as permits for no large office building, hotel, theater or other important structure were issued during the month.

In the opinion of architects and contractors a still greater increase in the number of permits would have been shown but for the scarcity of labor in almost all branches of the building trades. So serious has this scarcity become that a number of contractors are said to have been greatly embarrassed, and predict that unless conditions are speedily relieved there is likely to be a marked falling off in the amount of new work started. Owing to the complaint about the slow progress of work on a number of buildings, owners and architects have been holding back requests for bids.

For the first six months of this year 2025 permits were issued for building improvements costing $4,130,195, as compared with 1789 permits for improvements costing $5,098,005 in the first half of last year.

Cleveland, Ohio.

The members of the Builders' Exchange to the number of 250 enjoyed their annual outing this year in a trip to the Thousand Islands, the itinerary extending from June 26 to June 30 and involving a journey of a trifle over 1000 miles. The members and their guests left Cleveland on Tuesday evening on the steamer City of Buffalo and arrived in the city of that name on Wednesday morning, where they were met by representatives of the Buffalo Builders' Exchange. After breakfasting they boarded a special train on the New York Central road and at 12.30 arrived in Syracuse, where they were greeted by members of the local Builders' Exchange. After a short stop for luncheon the party continued on its way to Alexandria Bay, where accommodations had been provided at the Thousand Islands Hotel. Wednesday evening there was a "friendship social" in the parlors, with vocal and instrumental music, followed by dancing with orchestral accompaniment. On Thursday forenoon there was a trip on a special steamer, the tour being known as the "Thousand Islands Ramble," covering about 50 miles among the beautiful islands of that locality. In the afternoon there was a ball game and athletic sports and in the evening a searchlight trip, by which the members had the opportunity of viewing the islands and summer homes by electric lights. On Friday morning, June 29, the tourists left Alexandria Bay by special boat for Clayton, and from there by special train to Syracuse and Buffalo, from which point they returned to Cleveland by the same steamer that carried them over.

The arrangements for the trip, which was a most delightful one, were made by the Entertainment Committee of the Builders' Exchange, composed of Charles W. Taylor, chairman; C. G. Leavenworth, John Thompson, Frank Carson and W. H. Robinson.

The party was in charge of W. F. Herman, the general passenger agent of the Cleveland & Buffalo line, who carefully looked after the interests of the tourists and rendered the trip memorable among the outings which the members of the exchange have enjoyed in the past eight years.

Dallas, Texas.

More building has been projected during the past six months in Dallas than ever before in its history, and the records of the Building Inspector's office show that the total value of the improvements for June was the largest of any single month since the office was created. For the quarter ending June 30 there were 483 permits issued for buildings valued at $1,356,005, as compared with a valuation of $937,490 for the corresponding period last year. Since January 1 887 permits were issued for building improvements estimated to cost $1,908,794, while in the corresponding period of last year 845 permits were taken out for improvements valued at $1,614,855.

For the month of June this year 124 permits were issued for buildings valued at $631,777, this, as stated, being the largest in value in any single month in the history of the office.

Denver, Colo.

Building permits for the city of Denver for June amounted to $1,246,997, an increase of nearly half a million over the same month in 1905 and of 60 per cent. over June, 1904.

The largest item in the total is for business buildings and work of that class, $440,100 being the amount. The addition to the Denver Dry Goods Company's building, $315,000, is the largest single permit that has been issued in Denver for many months. On top of this came the new Y. M. C. A. Building, which called for an expenditure of a quarter of a million, making a very good total for these two buildings alone. There were several smaller buildings of the same class and in residence work June made a good record. The Building Inspector's report shows the following record of permits:

Number.	Building.	Cost.
103	brick residences	$257,700
59	additions, alterations, &c	83,145
28	barns and sheds	15,450
15	business buildings	440,100
1	apartment house	5,000
1	terrace	10,000
1	hospital	25,000
2	fire houses	25,000
9	frame residences	5,600
2	school buildings	73,627
1	Y. M. C. A. building	275,000
1	church	7,000
34	miscellaneous small buildings, &c	24,375
257	Total for June	$1,246,997

July also promises to be a good month, with the Auditorium coming up almost any time, and which will mean $400,000, the Colorado National Bank Building, $500,000, Barteldes seed warehouse, $50,000, besides smaller work. The architects are all busy, and the year promises to be the best in the history of the city's growth. There appears to be a genuine boom in residence work. The labor troubles that threatened in the spring have subsided, and the entire community is working for the good of the city.

Kansas City, Mo.

There continues to be a steady increase in the amount of building that is being done in the city, all of which would seem to indicate that neither the high cost of materials nor of labor are interfering seriously with building operations. The city is steadily increasing in population and as it grows it demands additional homes, and present indications seem to point to a healthy augmentation of operations in the way of providing habitations for the newcomers. One of the leading improvements to be undertaken in the immediate future is the new Bank of Commerce Building, which will cost $150,000. According to S. E. Edwards, Superintendent of Buildings, the total number of permits issued in June for the current year was 409, involving building operations estimated to cost $1,453,140, these figures comparing with 396 permits involving an outlay of $1,021,940, in June of last year. The total number of permits for the first six months of 1906 was 1895, involving an estimated cost of $5,342,035, whereas the first half of last year there were 2064 permits issued for building improvements costing $5,003,777.

Milwaukee, Wis.

The amount of new building work in progress at present is fully up to the average, and for the month of June shows a slight gain over the same month a year ago, but for the six months there is a slight falling off. According to the figures compiled in the office of Inspector of Buildings Edward V. Koch there were 390 permits issued in June this year for building improvements estimated to cost $1,445,325, whereas in the same month last year 426 permits were taken out for building improvements costing $1,196,523.

Comparing the statistics for the first half of the two years it is found that from January 1 to June 30, 1906, there were 2,011 permits issued for improvements estimated to cost $4,551,947, as against 2225 permits for building improvements involving an outlay of $4,643,568 in the first half of 1905.

Philadelphia, Pa.

The first half of the year 1906 proved a record breaker in the history of the building trades in the city of Philadelphia. Permits issued by the Bureau of Building Inspection covered 10,206 operations at an estimated cost of $22,378,085, this being somewhat over a million and a half dollars in excess of the amount for the corresponding period of 1905, when 9451 operations were authorized at a cost of $20,784,220, which previous to this year was the largest amount for any corresponding period of which the bureau has records. The increase shown so far this year was due to the great amount of building, principally the modern type of dwellings, which was begun during the early portion of the year, and which still continues at a high rate at the present time. Comparing the first halves of 1905 and 1906, the records show that 5821 new houses were built at a cost of $13,344,260 during the former period, while 6375 houses were built or are in the course of erection during the latter period at a cost of $14,672,840, a gain in favor of the first half of this year amounting to 554 houses at an increased cost of $1,328,580.

By far the greater amount of dwelling operations at this time is in the erection of two-story houses, permits for 5571 having been taken out during the first half of this year, in comparison to 5153 for the corresponding period last year.

During the month of June 801 permits were issued by the Bureau of Building Inspection, covering 1700 operations at an estimated cost of $3,484,960. This shows a decline for the month when compared to June, 1905, of 68 in operations and $1,082,560 in cost, and when compared to May of the present year a decline of $1,401,705 in cost and 195 in operations is shown. Analyzing this we find that while the loss during June on two-story dwellings has been but $155,770, that on alterations and additions, manufacturing plants and warehouses, schools, churches and club houses, aggregates a total of $1,133,380. The decline, therefore, indicates no weakness in the future, inasmuch as a number of propositions, the cost of which runs into high figures, are expected to develop into active work at an early date, and which will no doubt offset the losses recently shown in that class of building. Last year broke all previous records for the construction of dwelling houses in this city, and from the work already completed and under way, together with that in contemplation, there is scarcely room for a doubt that the record for the full year of 1906 will show a large increase over that of its predecessor.

Operation work is being pushed forward with rapidity in all parts of the city. Contractors find it difficult in many cases to obtain materials and supplies as promptly as desired, and in some instances work is delayed on that account. More active conditions were scarcely ever experienced in the trade, and every branch is occupied at its fullest capacity.

The labor situation is with one exception in a satisfactory condition. The Journeymen Plasterers' Union having failed to reach an agreement with the Master Plasterers' Company for the ensuing year, which began July 1, have been on strike since that time. They demanded originally an increase in wages amounting to $1 a day, from $4.50 to $5.50, with double pay for overtime. This demand was later modified and a compromise offered by the union, making the wage $5 per day, or 50 cents advance on an eight-hour day. This latter, as was the original demand, was rejected by the Master Plasterers' Company, which would not agree to any change in the rate. The men are still out and the master plasterers have been doing most of their work with non-union labor, and while more or less delay is the result, owing to diminished forces, there are some cases where nearly the full complement of men are at work. In all other branches of the trade mechanics are well employed, and in some lines good men are hard to obtain.

Among some of the more prominent building operations started during the past month may be mentioned one by Frank P. Churchill on 32 two-story houses and a two-story store and dwelling in the Forty-third ward, at a cost of $56,750. The dwellings will be 15 x 35 ft., while the store and dwelling will be 15 x 41 ft.

Charles T. Hallowell has begun work on 26 two-story houses in the neighborhood of Fifty-third and Poplar streets. The houses will average 15 x 40 ft., and the cost of the operation will approximate $65,000.

John W. Emery has a contract to build 21 three-story houses and 22 three-story stores and dwellings, at Eighth, Passayunk and Washington avenues. This operation will cost $125,000.

Pittsburgh, Pa.

The fact that many of the planing mills in the city and vicinity have resumed operations is being reflected in a better supply of material for building operations and more satisfactory progress is being made in the building lines. A considerable amount of work is in progress, as may be gathered from the fact that during the month of June 433 permits were issued for improvements estimated to cost $1,567,382. The majority of the permits were for dwellings and stores, the erection of which has been delayed by reason of the carpenters' strike that has been in force since May 1. There were no permits issued during June for office buildings, but several that are under way are rapidly nearing completion. Among the latter may be mentioned the two 20-story structures which are going up at Wood street and Fourth avenue, for the Commonwealth Trust Company and the Union National Bank.

For the first six months of the year there was a decrease in the number of building permits issued by the Bureau of Building Inspection of from 10 to 15 per cent., as compared with the corresponding period last year.

St. Louis, Mo.

The atmosphere has been cleared considerably by the settlement of the strike which has paralyzed the building industry of the city for several months past. The origin of the whole trouble is said to have been due to a colored hod carrier who disagreed with his union and formed an independent union of hod carriers, the jurisdiction over which was the bone of contention and was the first cause of trouble between the bricklayers and the local branch of the Building Trades Council. Notwithstanding the trouble building operations have been conducted upon a pretty liberal scale, and during June 830 permits were issued for improvements estimated to cost $3,010,668, while in the same month last year 678 permits were issued for building improvements involving an estimated outlay of $2,163,148. Now that the strike has been settled it seems reasonable to suppose that the activity will be further stimulated.

St. Paul, Minn.

There has been a slight let up in building activity as compared with a year ago, as evidenced by the figures of the Building Department, which record the value of improvements for which permits were filed during the month of June as a trifle in excess of $800,000, while in June last year 334 permits were issued calling for an estimated outlay of $1,316,019.

The management of the St. Paul Builders' Exchange, the rooms of which were visited by fire a short time ago, has established temporary quarters in the Essex Building, 23 East Sixth street, where the facilities for transacting business are such as to closely approximate normal conditions. The exchange lost practically everything, and while covered by insurance it does not compensate for the inconvenience, &c., occasioned by the fire. Secretary A. V. Williams has lost no time in completing arrangements for a resumption of business and permanent quarters are expected to be rapidly completed.

Washington, D. C.

While there is considerable activity in building circles at the present time the records of the building inspector's office for the month of June shows a falling off in the volume of operations as compared with the same month last year, although the record indicates an increase over May. In the opinion of some of the real estate dealers, however, the apparent falling off in activities is by no means an unhealthy sign, as conservatism is the safe rule in real estate and building, and that a period of overbuilding is always followed by a time of depression. It is felt that the contemplated improvements when carried out will in no wise reduce the average maintained thus far the present season. The records for June shows 494 permits to have been issued for work estimated to cost $1,138,647. Of this total 98 permits were for brick dwellings estimated to cost $607,100; 38 were for frame dwellings estimated to cost $115,400; 4 were for apartment houses estimated to cost $111,000; 16 were for stores; 4 for warehouses; 2 for office buildings and 1 for a school.

Notes.

The long existing differences between the members of the Builders' Exchange of Tampa, Fla., and the Building Trades Council were adjusted June 27 at a conference between committees appointed by the respective organizations. The carpenters', painters' and plumbers' unions were included in the settlement, which was by arbitration, the members of the board representing the Builders' Exchange being W. D. Wiggins, M. M. Jetton, John Shea and J. H. Drew. The result of the settlement was the immediate resumption of building operations.

The Master Builders' Association of Pittsfield, Mass., has just been incorporated for the purpose of maintaining exchange rooms for conference and discussion of trade, architectural and business matters.

◆

San Francisco Building Situation.

With the final adoption of the new building law it is expected that the period of temporary construction will be brought to a close. The authorities are still allowing temporary wooden and sheet iron buildings to be put up without permits in all sections of the city with the understanding that they shall not be ordered removed for a reasonable time and after ample notice. Nevertheless, comparatively few of these buildings are expected to be undertaken from now on, as with those still under construction there will be enough to satisfy immediate needs and most property owners and business houses are anxious to get permanent structures under way.

During June the Board of Public Works issued 447 "paid" permits for new buildings and for alterations to existing structures. The total estimated value of these improvements was $1,634,859. This does not take into account the cost of the temporary building operations or repairs or for minor work where less than $500 is involved and for which no fee is charged. Under this class it is estimated that something like 1,250 buildings were undertaken during the month, though no exact record was kept. Likewise the report of the Board of Public Works does not take into account many buildings for which applications for permits were filed but on which no action was taken owing to the rush of business in the building department. The "paid" permits for the month included: Frame buildings to cost in the aggregate $941,961; 20 "Class C" buildings to cost $348,900; 1 "Class B" building to cost $30,000, and alterations and repairs to the amount of $314,268.

Among the more important of the new buildings which are already planned for early construction are the 15-story reinforced concrete Luning Building at the corner of California and Market streets to cost $300,000; the 7-story pressed brick Harshall Building on Sutter street near Mason, to cost $125,000; the 10-story stone and brick M. Friedman Building at the corner of Bush and Kearny streets to cost $180,000; the Frank H. Burk Building, a 6-story brick and terra cotta structure with marble vestibule at the corner of Bush street and Clara avenue, to cost $170,000; a 3-story steel reinforced concrete building for Mrs. M. S. Bliss on Kearny street near Bush to cost $42,000; the Western Meat Company's new building at the corner of Sixth and Townsend streets to be of reinforced concrete and to cost $125,000; the Timothy Hopkins warehouses, each 275 ft. square and 3 stories high of reinforced concrete on Townsend street between Fifth and Sixth to cost approximately $500,000, and the T. S. Williams brick building at the corner of Mission and Third streets to cost $150,000.

The plans of some of these buildings may have to be altered somewhat to meet the requirements of the new building ordinance, but the changes will, generally speaking, not be considerable.

The Humboldt Savings Bank Building.

The new building of the Humboldt Savings Bank of San Francisco, for which a permit was granted before the great fire, will, it is given out, be proceeded with along the lines originally laid out. As planned the building will be considerably above the requirements of the new ordinance, but it is claimed that the prior permit will prevent any interference with its construction. The building will be 20 stories high and the superstructure will have reinforced concrete walls 6 in. in thickness instead of brick as originally intended. The steel for the frame was ordered some time ago and work on the foundations will now be rushed.

Dry Rot in California Capitol.

The contractor for the repairing and remodeling of the California State Capitol at Sacramento has discovered that the 12 x 14 in. Oregon pine trusses supporting the roof of the building which were put in place in 1868 have been affected by dry rot to a dangerous extent, every truss being badly weakened. He states that it is remarkable that the roof has not already collapsed. Steel trusses are now being hastily put in.

Building Materials in San Francisco.

Although there is as yet no serious shortage of lumber as a result of the seamen's strike or lockout which has affected the steam shipping of San Francisco for the past few weeks, the situation is still regarded as dangerous by builders. So far the owners of sailing vessels have kept out of hostilities and at the present time a number of lumber carrying steamers are being operated by non-union crews. Since the strike began probably 60,000,000 ft. of lumber have come in, the bulk of this being brought in during the last two weeks. It is feared, however, that on the one hand the owners of the sailing vessels will cast their lot with the steamer owners, and on the other hand that the strike will in the near future involve the lumber shipping points along the coast, thus preventing the loading of cargoes for this city. In the meantime the retail lumbermen are gathering in as large stocks as possible in order to be ready for eventualities.

Some brick manufacturers are inclined to think that there will be a scarcity of brick for reconstruction work soon after the latter gets well under way, but the general idea is that with the present facilities the supply can be kept equal to requirements. The quantity of second-hand brick now in the city is enormous. A rough estimate places the second-hand brick at 1,125,000,000, of which amount probably 20 or 25 per cent. can be used for foundations and some other lines of construction work.

From present indications there will be a sufficient supply of cement on hand for the foundations of all of the permanent structures now planned by the time the contractors actually need it. Although there has been a great scarcity of cement here for the past year or more, immense quantities of foreign cement have been ordered during the past three or four months in Europe. Arrivals of foreign cement have not been large since the great fire, but nearly 500,000 barrels are expected to arrive by sea from England, Germany and Honolulu before January 1. The

rush will continue until well into next spring. Prices for cement delivery next year are on a basis of about $3 a barrel as against $3.50 now, although prices vary with the quality of the foreign brands.

Repairing Earthquake Damage at Stanford University.

Repair work which will aggregate several hundred thousand dollars is now under way at Leland Stanford Jr. University, Palo Alto, Cal. Many of the handsomest of these buildings were wholly or partially wrecked by the late earthquake. All the buildings of the two quadrangles will be ready for occupancy when the new college year opens in August, as well as the men's and women's dormitories. The gymnasium building will be torn down and rebuilt along other and more substantial lines. The memorial chapel, new library and the museum will also be rebuilt in more durable form. The buildings which are absolutely necessary to the college work will be rehabilitated first before proceeding with other reconstruction details.

San Francisco's New Building Ordinance.

The new building ordinance for San Francisco which has been under consideration almost ever since the fire has now been finally passed and signed. The distinctive features which mark a new departure in San Francisco building are the limiting of the hight of buildings of all classes to one and one-half times the width of the streets and the admission of reinforced concrete on a par with brick in all forms of construction. Both brick and reinforced concrete are included under the term "incombustible material" in the classification of buildings. The hight limitation will restrict building, as the streets are at present constituted, to 150 ft. on Market street, the city's leading thoroughfare and the widest of all the streets except Van Ness avenue, which has heretofore been a purely residence street. Heretofore buildings have been allowed to a hight of 220 ft. It is understood that the restriction was inserted in the ordinance with the idea of compelling property owners along some of the leading streets to submit to a widening of these streets.

Classification of Buildings.

For purposes of classification the ordinance designates the buildings as "Class A," "Class B," "Class C," "Mill Construction" and "Frame" buildings.

"Class A" buildings shall be built with a steel frame supporting the floor and wall loads, the structural parts to be built of incombustible materials. "Class A" buildings may be built anywhere in the city and county; provided, however, that no building of this class shall be constructed to a greater hight than one and one-half times the width of the street upon which it fronts.

"Class B" buildings shall be built with the walls supporting the adjacent floor loads and with steel or reinforced concrete columns supporting the interior portions of the floors, or with walls self-supporting only and floor loads carried entirely by steel, cast iron or reinforced concrete, and the structural parts of the roof shall be of incombustible material; that no building of this class shall be constructed to a greater hight than one and one-half times the width of the street upon which it fronts. "Class B" buildings may be built anywhere in the city or county; provided, however, that this type of construction shall not be permitted for theaters.

"Class C" buildings shall be built with walls supporting the adjacent floor loads and with the interior floors supported by studded partitions, or by wooden, steel or cast iron columns and wooden or steel girders. Combustible material may be used in all parts except walls. The limit of hight of this class of buildings shall be 84 ft. if metal lath be used throughout, and the limit of hight shall be 55 ft. if wooden lath be used or if not lathed: provided, however, that no building of this class shall be constructed to a greater hight than one and one-half times the width of the street upon which it fronts. "Class C" buildings may be built anywhere in the city and county; provided, however, that this type of construction shall not be permitted for hospitals, sanitariums or sanatoriums, or within the fire limits for halls or places of public assemblage.

Buildings of the type designated "Mill Construction" are to be limited in hight to 45 ft. and are to be constructed only within prescribed limits.

Frame buildings may be constructed to a hight not exceeding 45 ft. anywhere in the city and county except within the fire limits; provided, however, that this type of construction shall not be permitted for theaters, hospitals, sanitariums or sanatoriums. These buildings may be built entirely of combustible materials, with certain exceptions as to roofs.

General Hight Limitation.

Buildings throughout the city shall not exceed in any case one and one-half times the width of the street upon which they front. Buildings fronting upon two streets shall be governed in hight by the width of the wider street. Where no street is established the hight of buildings shall be determined by the Board of Public Works.

Special Buildings.

Department stores, warehouses and buildings without partitions and used for the storage of merchandise shall be of either "Class A," "Class B" or "Class C" construction and shall be limited to the hight prescribed for said types of construction; provided, however, that no building of this character shall be constructed to a greater hight than 102 ft.

Halls and places of public assemblage seating more than 300 people shall be of "Class A" or "Class B" construction.

Every building hereafter erected and every building now erected and not now used, but hereafter to be used for hospital or sanitarium purposes for human beings shall be of "Class A" or "Class B" construction.

Every theater or opera house hereafter erected to be used for theatrical or operatic purposes must be constructed in accordance with the requirements of the ordinance relating to "Class A" or steel frame construction. No building which at the time of the passage of this ordinance is not in actual use for theatrical or operatic purposes, and no building hereafter erected not in conformity with the requirements of this ordinance shall be used for theatrical or operatic purposes until the same shall have been made to conform to the requirements of this ordinance. And no building herein described shall be opened to the public for operatic or theatrical purposes until the Board of Public Works shall have approved the same in writing as conforming to the requirements of this ordinance, and the Tax Collector shall refuse to issue any license for any performance in any such building until a certificate in writing of such approval shall have been given by said Board of Public Works.

Reinforced Concrete.

Reinforced concrete walls shall be at least 6 in. thick. If the area of wall surface included between any two adjacent wall columns and adjacent floor girders exceeds 300 sq. ft. and is less than 400 sq. ft. the thickness of the wall shall not be less than 8 in. If such area exceeds 400 sq. ft. the wall thickness shall not be less than 12 in., supported on the steel frame at each story. If the concrete be not reinforced the minimum thickness of walls shall be 12 in.

Area Steel Reinforcement.

In reinforced concrete walls the area of steel reinforcement shall aggregate 1 per cent. of the area of the concrete, one-half of which shall be placed vertically and one-half horizontally. No reinforcement shall be spaced more than 12 in. apart. Additional reinforcement shall be placed around openings, and all reinforcement shall be wired at each intersection. All reinforcement shall be rigidly connected at columns and girders to the steel frame.

Brick.

Brick walls shall be at least 13 in. thick, and all brick shall be laid in cement lime mortar or in cement mortar. All brick shall be completely surrounded by mortar except on the face.

In all brick walls every sixth course shall be a heading course.

All brick walls shall have a supporting part of the steel frame, which shall extend to within 2 in. of the face of the wall.

PRACTICAL PLUMBING IN A COUNTRY JOB.

A RECENT INQUIRY concerning such work leads me to believe the following description of the supplies of a country job will prove interesting. Once before I have had *carte blanche* on a country job without even a limit to cost. The work here mentioned had no restrictions nor suggestions from the owner except as to the money available.

My customer appeared with the statement that he had bought the Blank place and had not built it, for "fools build houses for cranks and wise people, you know." "Yes, yes," said I, "and to finish the story wise people buy them on the basis of supposed cheapness because there is a lot of good material put together in an unsatisfactory manner, and then proceed to correct errors until their money gives out." "That is the situation exactly," said he, "and after providing for what else must be done there is just $450 to add to the plumbing." "You see to that and don't reserve any questions of any nature for me to answer."

There was no place for a bathroom except a 6 x 6 foot spot that would have answered for a portable tin tub. One wall of this was extended and the partition moved 3 feet to make room for the bath. Part of a 13-in. brick wall was cut away and two stud partitions put in to make a compartment for the water closet, with a door opening into the corrridor. A square double sash window was put in the brick side to give light and air. This compartment left room for a recess lavatory next to the bathroom window. It was set forward flush with the new partition wall. The soil line against the kitchen wall downstairs was extended up behind the lavatory back and inclosed by a small cupboard with one door with mirror in the lower panel. The lavatory supplies have valves. The water closet is supplied by 1½-in. pipe direct from attic tank by means of a direct time flushing valve. The bath is center outlet with bell supply and waste fitted through rim. The bell has threaded opening so hose can be attached. All of these features are indicated by Fig. 1. Fig. 2 shows the sink and pump arrangement in kitchen. The pump air chamber discharge leads up to and over tank. An opening was left near the pump so water may be elevated by other means if desired. The pump faucet was piped up and over so as to discharge into sink. The telltale pipe leads down behind sink back and out through a neat nickel plated nozzle, as shown. The sink supplies are fitted with stop cocks. There are no air chambers to the sink faucets. The supply is from a cistern. There are two, large and well built, on the place.

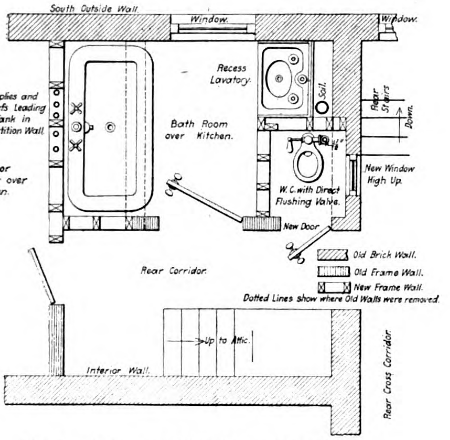


Fig. 1.—Bath and Other Rooms Over Kitchen.

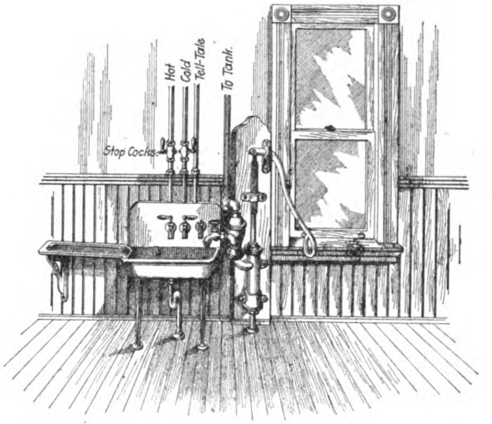


Fig. 2.—Sink and Pump Arrangement in Kitchen.

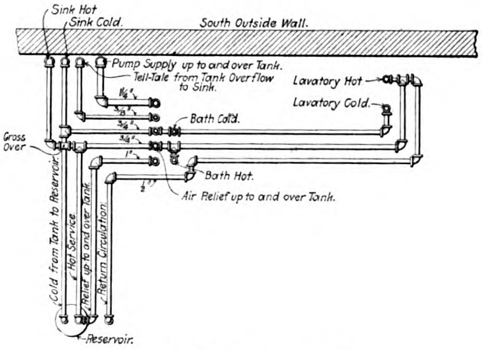


Fig. 3.—Piping on Kitchen Ceiling.

Practical Plumbing in a Country Job.

In Fig. 3 are shown the supplies on the kitchen ceiling. The system provides for positive circulation to keep hot water near the bathroom fixtures. The hot supply is on left side for each fixture. There is only one pipe crossed (by crossover), and it does not interfere with draining the job. There are no traps in the supplies nor drain cocks to be forgotten. There is a relief line from the reservoir to the tank, so it is not possible to close every way of escape for vapor or steam. The hot supply and cold service are both open to the air at the tank. The disadvantages are that the cocks which stop the hot water to the bathroom are over the reservoir, as is the one which stops the cold supply to reservoir. While each fixture can be controlled separately, aside from its regular faucets, the whole lines are not under control individually. This plan is far from ideal when compared with a separate supply job complete in every detail. But as ordinarily installed I take the separate supply to be inferior because there the service of the whole job is at the mercy of more pipe and fittings, quite as likely to fail as any in this. The arrangement described embraces every feature essential to perfect service and with the least possible material. Seven plans of this ceiling work were drawn before the one shown was decided upon as the best possible in sequence, symmetry, &c.

The telltale is certain to warn the pumper, even though some settling from side shrinkage should take place. The lining is sweated in, as indicated in one of the details of Fig. 4, the bottom being inside of the side lining and its corners worked up solid. Twenty years' service has proved this method of lining superior to wiping the seams. The bull's-eyes in side lining are as

usual, except only 2½ inches in diameter, and have but two screws each.

The exit of house supply from tank is by way of a standing bath waste extended. The overflow holes act as a vent to the line. The bottom fitting is wiped direct to tank lining. The collar of inlet opening is fitted with gauze. A chain extending to the kitchen is attached to the lifting stem. The tank is braced one-third distance from each end, with stays at side and rods across at top and bottom.

A good dry well was found on the place. It had been made to receive the waste from a square iron sink in the kitchen. No trap to the waste nor supplies to sink even had been put in. If any of the readers have given special attention to laying out of supplies I would be pleased to read of the work in these columns. There is very little work we can really derive help from in this branch that is likely to come under personal observation, and I am sure the supply work is worthy of the best efforts we can make.

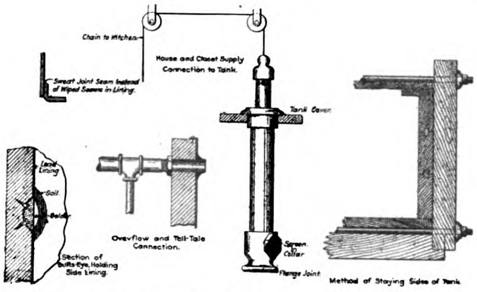


Fig. 4.—Details of Tank Construction and Fixtures.

Practical Plumbing in a Country Job.

◆◆

Roman Theaters.

The earliest theaters at Rome, as at Athens, were mere temporary buildings of wood, removed when the immediate occasion for them was over. Stage plays were first introduced A. D. 391. For 200 years the Romans continued satisfied with standing room; for in the year 599 the Censors Valerius Messala and Caius Cassius, wishing to build a permanent theatre, were prevented by the Senate at the instance of Scipio Nasica; and at the same time an order was made that no person should provide seats at public spectacles within a mile of the city, "that the manly habit of standing, combined with mental relaxation, might be the peculiar mark of the Roman people"; or according to Tacitus, "lest, if the people sat, whole days might be spent in idleness." Mummius, the destroyer of Corinth, transported the furniture of the Corinthian theater to Rome, and at his triumph represented plays in the Grecian manner, for the first time, about the year 610.

The first permanent theater was built by Pompey and finished in 699. Up to that time the ædiles or other persons who exhibited theatrical amusements constructed edifices on purpose, at an enormous expense, and with such splendor as would have seemed meant to hand down the name and magnificence of the founder to the latest posterity, instead of serving merely for a passing pageant. But money lightly earned is generally prodigally spent; and extreme magnificence in works of ornament is seldom consistent with the happiness of those at whose expense in reality they are constructed. The immense wealth which supplied these costly entertainments, says a writer in a recent issue of the *Architect and Contract Reporter*, was the fruit of unjust conquest, or the spoils of subject provinces, and was thus prodigally lavished merely to obtain favor in the people's eyes, and procure other and more lucrative appointments.

Celebrated above all others are the theaters of Scaurus and Curio, which are minutely described by Pliny, and will show how far the prodigality and splendor of ancient Rome surpassed all that modern extravagance has ventured or modern means supplied. Pompey's theater was constructed after he returned from Asia at the close of the Mithridatic war. Plutarch says that, stopping at Mitylene on his way home, he attended some dramatic representations there, and was so much struck with the building that he determined to erect one on the same plan but with greater splendor at Rome. It was not completed until his second consulship in the year 699, and even in that luxurious age either the ancient jealousy of permanent theaters still remained, or he was afraid of raising envy and prejudicing his popularity by giving his own name to so magnificent and proud a structure, for he built a Temple of Venus Victrix, the Conqueress, at the highest part of the cavea, and dedicated the whole to her, stating in the edict by which he summoned the citizens to the dedication that he had built a temple to Venus, "under which," he said, "I have placed tiers of seats to behold spectacles." It would contain 40,000 spectators. Subjoined to this building, and as it were a part of the establishment, were his own house, a portico, basilica and curia. It was in the latter that Cæsar was slain, after which it was shut up. It was splendidly ornamented with statues by eminent artists; among them were the images of 14 nations, those perhaps whom he claimed to have conquered. Near it in later times stood a remarkable colossal statue of Jupiter, erected by the Emperor Claudius. Being injured by fire in the reign of Tiberius, it was repaired by Caligula, and was again burned and restored by Claudius. It was burned a third time in the reign of Titus. Nero gilded the scene, the theater and everything employed in the performance to make an exhibition of his magnificence to a royal visitor, Teridates, King of Armenia; the very awning was purple, studded with golden stars.

◆◆

Taxes on Fireproof Buildings.

In a paper prepared by the president of the Ontario Association of Architects the suggestion was made that owners of buildings constructed of inflammable materials should bear the bulk of the burden of taxes for protection against fire. He argued that if an owner constructs a fireproof building the result is a direct benefit to the public and the owner entitled to profit accordingly. Having built at increased cost a building which reduces the fire hazard of a community, he should not be taxed for this extra investment. The tax on this extra cost should fall upon the owners who for the greed of gain build flimsy structures which are a fire menace to all surrounding property and necessitate the support of extensive and highly organized fire departments. No one will question but that there is much more than a grain of justice in the course suggested, says the *Inland Architect*. In view of the regulation in Paris to remit taxes on the best designed buildings, it would seem possible in America to in some way work out an adjustment of taxes that would recognize the value to the community of the construction of fireproof buildings by rebating a portion of the owner's taxes and placing a corresponding charge upon other buildings in the proportion that they lack fire resisting qualities. Much could be accomplished in this direction by the agitation of the subject by the reform bodies to be found in nearly all cities. To the extent that the standard of building would be raised and more regard paid to fireproof construction, the insurance companies would be interested to aid in the movement. The science of fireproofing is gaining continually in exactness, and an owner can depend upon getting just the degree of fireproofing that he is willing to pay for. If he will not have good construction, it is but just that he should be discriminated against by the municipality.

◆◆

THE United States Civil Service Commission announces the postponement to August 8 and 9 of the examination scheduled for July 5 and 6 to secure eligibles from which to make selections to fill a vacancy in the position of architectural and structural steel draftsman, previous reference to which was made in our issue for last month.

LAW IN THE BUILDING TRADES.

By W. J. Stanton.

THE SUPREME COURT of Rhode Island holds in the case of Field *vs.* Consolidated Mineral Water Company, that an architect who prepares plans and specifications for, and supervises and directs the construction of a building and fixtures therein, is entitled to a lien thereon under a statute declaring that whenever any building shall be constructed it, together with the land, is made liable and shall stand pledged for all work done in the construction, erection or reparation of such building. The court says: "The plans of the architect are written directions to the workmen, and contribute to the building as much as the verbal directions of the overseer. Indeed, the main task of the superintendent is to enforce compliance with the working plans. If the same plans be preserved and used again elsewhere, so may the scaffolding which supports the builder at his work; but no one could doubt that the work of putting together such temporary adjuncts to the permanent structure should entitle the builder to his lien therefor. In a case like the present, where the architect draws his plans and uses them as his tools in the supervision of the work, we think he is entitled to a lien for the labor expended, both in the drawing and the supervision."

The great weight of authority under substantially similar statutes gives a lien to supervising architects both for the labor of supervision and the labor of preparing plans. In Pennsylvania an architect employed to make plans and supervise the construction in accordance therewith is entitled to a lien; but one who furnishes plans alone and does not supervise is not so entitled. In Nebraska a lien is given for merely furnishing plans. In Iowa it has been held that an architect has no lien for furnishing plans if they are not used. In Illinois and Ohio it is doubted whether the lien will apply for plans if there is no supervision. In Massachusetts the court allowed an architect for the labor of supervising, but not for the labor of preparing the plans.

RIGHT OF ARCHITECT TO A LIEN FOR PLANS AND SERVICES.

The Supreme Court of North Dakota has held that an architect is not entitled to a mechanic's lien for services in preparing plans and specifications for a contemplated building upon the building actually constructed on a different plan after the first plans for which the lien is claimed had been abandoned. The court also holds that services rendered in surveying and marking the site for a building and drawing a contract for construction of the building are not labor for which a mechanic's lien may be claimed.

PRIORITY OF LIEN OVER MORTGAGE.

An owner contracted with a contractor for the construction of a building, and by implication authorized the contractor to employ either directly or through subcontractors the necessary workmen to erect the building. Subsequently the owner conveyed the premises, and took a mortgage back from the purchaser. At the time of the conveyance, and the execution of the mortgage, the owner knew that a third person was performing labor on the building pursuant to a contract with the contractor. The Supreme Court of Massachusetts held that, under these facts, the claim of the third person for labor performed was superior to the mortgage.

LIEN AGAINST LANDLORD FOR TENANT'S BUILDING.

A tenant sought to purchase lumber on credit to build a house on leased premises, and was told that it was not customary to sell lumber on credit to any one not the owner of the premises on which the building was to be erected, and that an order from the owner would be necessary. The landlord on being told by the tenant that he could procure the lumber if the former would permit the construction of the building wrote a note to the lumber dealer, as follows: "It is O. K. with me as for Mr. O. having the lumber and building." After having received this note the lumber dealer sold the tenant the lumber. Under these facts the Supreme Court of Iowa held that the seller of the lumber was not entitled to a lien on the landlord's interest in the premises.

TIME FOR FILING LIEN.

The Supreme Court of Wyoming has held in a recent case that one seeking a lien must file a statement within 90 days after the indebtedness shall have accrued, and the indebtedness is to be deemed as having accrued at the date of the furnishing of the last item originally included in the account, and not at the date of the last item which remains unpaid.

LIMITATION OF TIME TO ENFORCE LIEN.

The California Court of Appeals, in the case of Hughes Brothers *vs.* Hoover, holds that where, on default of a building contractor the owner, in accordance with the express terms of the contract, terminated the employment and completed the work, the 90 days' limitation of time to commence actions to enforce mechanics' liens commenced to run against a person who furnished materials to be paid for within 35 days after completion of the building, at the end of 35 days from the owner's completion of the work, and not from the contractor's abandonment of it.

The case also holds that where a material man was to be paid in installments during the work, the last payment to be made 35 days after completion of the building, he did not lose his lien for the first installments where he commenced an action to enforce the lien more than 90 days after the completion of the building, but within 90 days from the expiration of the 35-day period.

ACCURACY REQUIRED IN LIEN AFFIDAVITS.

In a case before the Michigan Supreme Court it was held that lien laws must be strictly construed, the court saying: "Lien proceedings are harsh and must be strictly followed, and the law will not permit one to recklessly make an affidavit of the amount due without any knowledge, thinking he may afterward correct it, when in fact the claim made is 25 per cent. too large. The statute requires a verified statement to be filed, which must contain a 'true and just acount of the demands over and above all legal set-offs.' The affidavit must be made by one who knows the facts. This statement, when filed, creates the lien, and the law excuses only an honest mistake in stating the amount due, made by one cognizant of the facts."

SERVICE OF LIEN ON WIFE IN ABSENCE OF HUSBAND.

The Michigan Supreme Court has construed the statute providing for service of a lien on the agent of the owner when the owner cannot be found in the county at any time during the 10 days next after filing the statement of lien. The court holds that service of the claim of lien on the wife of the owner is valid as service on the agent of the owner when it is made to appear in fact that the wife is in charge during her husband's absence. Regarding the wife as agent of the husband during his absence, the court says: "It may be inferred from this testimony that the appellant never expressly delegated to his wife any authority to act as his agent; that he never expressly committed to his wife authority to control the homestead premises in his absence, and that she never exercised such authority. The intention of a husband to commit the charge of the homestead premises to his wife when he leaves her at home and goes away for a temporary absence, though not expressed, may generally, if not always, be inferred. I think that intention should be inferred in this case. I think that appellant intended that the authority of his wife to control the homestead premises should, if asserted, be recognized, and that he intended that his employees should understand, as they did understand, that in his absence whatever orders she gave should be obeyed. It is to be inferred, then, that appellant intended to give his wife full authority to control the premises in his absence. Though she never exercised this authority, she nevertheless had it. This made appellant's wife his agent during his absence. It follows that the statement of lien was properly served.

TIME LIMIT FOR COMPLETION OF WORK.

A building contract required the stores and basement to be completed and delivered ready for occupancy by tenants on March 1, 1899, and the whole of the work to be "wholly completed" on April 1, 1899. The contract also provided that if the contractor failed to deliver the stores and basement as provided, he should forfeit $30 a day for each day's delay, and $10 a day for each day of delay in the final completion of the buildings, which forfeit was to be deducted from the contract price. On May 20, 1899, the plastering having been found to be unworkmanlike, a controversy arose, which was continued until October 6, 1899, when the contractor was ejected by the owner before fully completing the building, having in the meantime remained in possession for the purpose of going on with the contract, if required, after the settlement of the differences.

On these facts the Supreme Judicial Court of Massachusetts, found in the case of Phaneuf vs. Corey, held that the owner was entitled to a forfeit allowance of $10 a day until the date of the contractor's ejection. The matter had been submitted to arbitration and the award by the arbitrator was attacked. On this point the Court held that where parties submit their differences to arbitration, they are bound by an award within the scope of the submission, notwithstanding mistakes of the arbitrator as to questions of law and fact.

HOLLOW BRICK WALL CONSTRUCTION.

In view of the increasing use of hollow building blocks and the popularity with which they are being received in various sections of the country, the question often arises as to whether or not it is possible to construct walls of solid brick in such a manner that they will possess the qualities claimed for the hollow block construction. In discussing this matter R. H. Minton presents in a recent issue of *The Clay Worker* some particulars relative to the comparative merits of solid and hollow wall construction which cannot fail to prove interesting to many of our readers. We take pleasure, therefore, in presenting the following, together with the diagrams accompanying the author's comments.

It is a well-known fact that one of the chief difficulties of a solid wall is that it will "sweat," or conduct moisture from the outside to the inside. The softer the brick the worse this sweating becomes. Many instances are known where the moisture collects in a house in such quantities as to run down the plaster. This condition not only ruins the plaster, paper and finishing, but produces a damp, musty and unhealthy condition. The conducting of moisture is also very detrimental to the wall, for often very soft brick are used in the interior, and sometimes in tearing down old buildings the moisture has acted upon the soft brick to such an extent that the brick fall to pieces when handled. Stone houses are notorious for this condition. One instance comes to mind of a limestone house costing $100,000 being abandoned a few months after it was finished, during which time two members of a family of three died of pneumonia. The house was built upon a high hill, yet the interior was ruined by water coming through the walls.

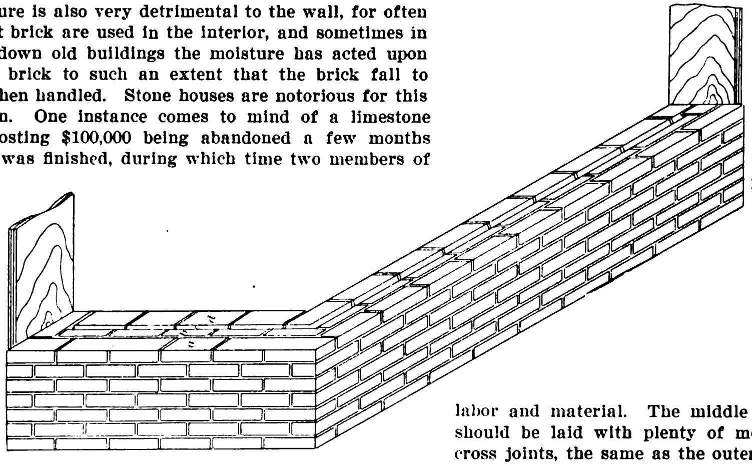


Fig. 1.—Form of Construction Often Used for Dwelling Houses.

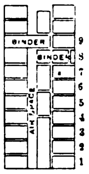


Fig. 2. — Cross Section of Wall.

Hollow Brick Wall Construction.

A wall built with a hollow construction has a dead air space which is an excellent nonconductor of heat, cold, moisture and fire. And this is the strong argument for hollow brick and block construction. Of course the ideal wall would be one with a perfect air space, containing no conducting materials. This is not the case with hollow block walls, which have the air space within the block, but also afford some conducting material through the wall. But even with this objection it is far superior to the solid wall. It is not as strong, nor capable of carrying as heavy loads, but it makes a much dryer construction, with less temperature changes within, being dry and warm in winter and cool in summer. The hollow space of dead air acts as a nonconductor.

Now if it is possible to make a hollow construction of solid brick having a perfect dead air space it would be superior to the hollow clay or concrete block construction, for the reasons that the wall would be stronger, and in having little or no clay in the air space the nonconductivity is better.

During the last ten or twelve years the writer has worked on quite a number of buildings where hollow walls were used. Slightly varying methods have been used, depending upon the structure and its requirements, the class of work and the quality of work wanted. Unfortunately, the majority of builders do not want to pay for first-class work, or the best that is possible, preferring to get it done as cheaply as possible, to the detriment of the building.

The simplest form of construction for a dwelling house is a wall built of an outer course of 4½ in. and an inner course of 4½ in., with an air space of 1 or 1½ in., or possibly more, between them. This wall may be bonded with either brick or with a metallic bond. Wire is often used, gives good results and admits of a perfect air space. Such a wall is amply strong for two story dwellings. An instance is known where a large church, with high gables, was built in this manner, except that the air space was 4 in., thus making a 13-in. wall with only 9 in. of brick work. The walls are bonded with brick and the building has been standing for more than 15 years.

When the walls are securely bonded the hollow construction is as good as or better than a solid 13½-in. wall, for in building a solid wall the middle course of brickwork is usually laid in almost any way in order to get it done. Some unscrupulous contractors even go so far as to build the wall open and then bridge over in order to save labor and material. The middle course of heavy walls should be laid with plenty of mortar and with mortar cross joints, the same as the outer and inner courses. A 13½-in. wall well laid is much better than a 16-in. wall just thrown up.

In the accompanying diagram Fig. 1 is shown a form of construction which we have often used for dwelling houses with the most satisfactory results. The construction consists of the outer or face wall *a* of 4½ in., then a course of brick laid on edge, *b*, making 2½ in., then an air space, *c*, of 1½ or 2 in., and then an inner wall, *d*, of 4½ in. The cross section, Fig. 2, shows the plan of laying up, and diagrams Figs. 3 and 4 show method of bonding the wall. The wall is usually bonded every eighth course. By using this method of bonding no open headers appear on the face. One corner is cut off from each face brick as shown, and into this fits another brick which binds the face course and the middle course. Fig. 3 shows method of bonding outer courses and the inner course, by simply using a straight header. This method, of course, introduces a conducting material into the air space, which is objectionable, but probably makes a somewhat stronger construction than methods shown by Fig. 5, where the walls are bonded with wire or metal pieces.

Various methods can be devised for bonding the walls, but the ones here shown are probably as good as any. The walls are usually built solid up all window and door frames, thus insuring a stronger wall and ample support for the lintels and caps. Sometimes the corners are also built up solid.

There is no question about the superiority of the hollow construction when it comes to living houses. Instances are known where additions with hollow walls have been built to houses having solid walls, when a marked difference is shown in the temperature in winter and summer and in the amount of fuel required for heating the different rooms.

Hollow construction could be used in large buildings.

by using heavier walls and by the use of solid pilasters for supporting the floor girders. Hollow walls are of great advantage in building fruit cellars and cold storage buildings, poultry houses, in making partitions between fruit cellar and furnace in house basements, &c. Where a good job is wanted it is our custom to roughly plaster the outer wall in the air space before building up the inner wall. This insures an excellent job and could be used to good advantage in fruit cellars, ice houses and cold storage buildings. The air space should be built over solid at the top to prevent any circulation.

Hollow walls are not always the best, however. Some years ago a gentleman who was having built a round down draft brick kiln took a notion that a hollow wall would be beneficial. In accordance with his insistence the kiln was built with a 1-in. air space between the inner and outer walls of 9 in. each, with no bond. The first burn demonstrated the fallacy of this style of kiln construction, for the walls soon expanded and fell apart and the life of the kiln was short. But no doubt a hollow construction would be of advantage if some means could be found of securely bonding the walls, for withstanding the strains of contraction and expansion while heating and cooling.

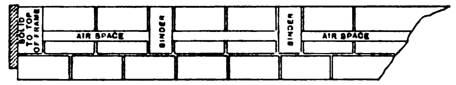


Fig. 3 DETAIL OF COURSE X8

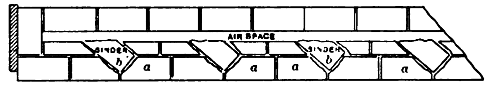


Fig. 4 DETAIL OF COURSE X8

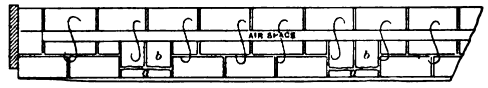


Fig. 5 METHOD OF BINDING COURSE X8 WALLS BOUND WITH WIRE

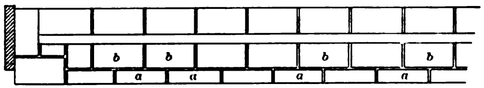


Fig. 6 METHOD OF BINDING COURSE X8

Hollow Brick Wall Construction.

As a usual thing bricklayers object to building hollow walls. They are harder to work on and require that the inner wall be laid to the line.

No definite figures are available from which to form a comparison of the cost of laying up a hollow and solid wall, but the final cost is about equal or possibly a little higher for hollow walls. A solid wall requires more material, but a hollow wall requires more labor, and as labor is higher than the cost of materials per thousand brick the final cost probably just about averages up.

But for the man who wants the best he can get and is willing to pay for it, especially for dwelling purposes, a well built hollow wall of solid brick, plastered roughly in the air space and bonded with brick, as shown in Fig. 1, is undoubtedly the best construction—better than cement, stone or hollow blocks. It insures against dampness and cold in winter, against heat in summer and against damage from fire.

A Public Comfort Station in Paris.

A company, which holds a concession from the city of Paris, France, built in November last year in Place de la Madeleine, that city, a double comfort station, which is the first of its class to be installed in Paris. It occupies an area underground of about 2515 square feet, but the stairways take on ground surface only about 215 square feet. The station was illustrated recently in *l'Hygiène générale et appliquée*, which shows that the two rooms are entirely separate, accessible by stairways at opposite ends. On the men's side one finds at the base of the stairway a lavatory with hot and cold water and a compartment for bootblacks. In the center there are 22 urinal stalls of porcelain with automatic flushing apparatus, and on each side there is a series of water closet stalls. One of these is free, six cost 10 centimes (2 cents) to use, three cost 3 cents each and three 4 cents, the last having mirrors and toilet with hot water. On the side for the women there is one free, nine at 2 cents, four at 3 cents and four at 4 cents. There is a glazed compartment in each room reserved for the janitor and janitress, as the case may be. The finish of the room is of white enamel brick, with a brick pavement and wainscot of mahogany and all metallic parts are of copper nickel plated. The details of the installation have been made with a degree of luxury that would contribute toward attracting the attention of the public to an interest in sanitary installations, especially by their comparison with the old arrangements, which left much to be desired. Stations are to be established ultimately in the more populous parts of the city, which stations, however, will have more simple furnishing. Lighting is arranged for by means of vault lights of reinforced glass, which form a part of the sidewalk above, and by electric lamps. The cornice of each room is hollow, and serves as a duct for ventilation, and an electrically driven fan placed in a nearby column on the sidewalk exhausts through the cornices, the air being replaced by a fresh supply admitted through the entrances.

Clean Chimneys Imperative in New Amsterdam.

One year after Petrus Stuyvesant, late of Holland, arrived in New Amsterdam and assumed director-generalship of the bartered Island of Manhattan he proceeded to take precautions against the breaking out of fires, whether started by Indians or due to an outburst of phlogiston. In 1648 this venerable one-legged Dutch commander appointed fire wardens, whose duties comprised the inspection of the wooden chimneys of the 120 thatched roof cottages of the village of 1000 people.

For every such chimney found insufficiently swept a penalty of three guilders, about $1.30, was imposed. In the collection of these penalties lay the founding of the future fire department, for the funds so collected were devoted to the purchase and importation of leathern buckets, hooks and ladders. In fact, about two years later the burgomasters contracted for 150 leathern fire buckets and ordered them hung up in the City Hall and in the houses of citizens living on streets afterward to become famous as Pearl, Broadway, Whitehall and Exchange place.

Somewhat more than a quarter century after Petrus Stuyvesant had appointed his chimney inspectors a law was enacted establishing the office of "viewers and searchers of chimneys and fire hearths," and defects in construction of either, a distinct advance toward present day ideas and standards, were penalized by a fine of 20 shillings. At the same time the law provided against careless tempting of trouble and put the burden of fire extinguishing apparatus on the individual householder. It was directed "that no person shall lay hay or straw or other combustible matter within their dwelling houses, and that provision be made for hooks, ladders and buckets," inflicting a fine of 15 shillings upon "every person who shall suffer his chimney to be on fire." Every house with two chimneys must be provided with one bucket; a house having more than two hearths must provide two buckets. Brewers and bakers had to provide six buckets, with a 6-shilling penalty for each bucket short.

It is only fair to add in conclusion that we have drawn extensively from an historical sketch recently printed in the New York *Commercial*, which truly says the stride of 250 years to the present time is attributable to a great extent to the foundations laid in the primitive Dutch settlement. To take Manhattan and The Bronx alone there are in the force over 1800 officers and men who are paid salaries ranging from $800 for fourth grade firemen up to $2160 for foremen.

Finishing Outer Surface of Concrete Walls.

A rather novel method of finishing the outer surface of the walls of a reinforced concrete building was recently adopted in connection with a structure in Knoxville, Tenn. The sides of the building have curtain walls of concrete brick, while the front and back walls are monolithic construction. When the work was completed the front elevation was treated to a cement solution applied by means of whitewash brushes. The solution consisted of water and cement of the consistency of thin grout, which was trained through cloth to remove any coarse particles that might scratch the concrete surface of the building. The coated surface was given a light and quick rubbing with carborundum bricks until a very smooth surface was obtained. The thickness of the solution prevented it running off the wall and served as a plaster as well as a dressing. The result is a front of one color and which closely resembles limestone.

◆

Congress for Improving Health in Dwellings.

The second International Congress of the Association for the Promotion of Hygiene and Salubrity in Dwellings will hold its inaugural meeting at Geneva, Switzerland, on Tuesday, September 4, and sessions will continue until Saturday, September 8. The aim of the promoters is to continue the work begun by the preceding congress, which started and centralized the study of general questions dealing with different kinds of habitations. The object of the second congress is to devote special attention in each branch to a certain number of points which call for more thorough elucidation, at the same time leaving the discussion open on questions which may eventually be raised by the communications presented. To this end an appeal has been made to professional men of all countries, to architects, to hygienists and to doctors, to deliberate in common on a problem the solution of which has much to do with the health and prosperity of people everywhere. A programme which has been issued gives a list of the members of the different committees as well as information necessary to afford an idea of the questions proposed for discussion at the congress.

Some phases of the subjects to be treated relate to the housing of servants, the danger of underground flats, the distribution of workmen's dwellings in cities, and the means of insuring their wholesomeness and salubrity; the housing of farmhouse servants and laborers; the means of spreading knowledge of the laws of health among the peasantry; sanitary conditions necessary in hospitals, asylums, &c.; the hygienic situation and construction of theaters, lecture halls, work shops, factories, &c., and the vitiation of the air in public and private schoolrooms, and how to remedy it. The point is made that Swiss schoolhouses are models of hygiene in this respect and may be visited with benefit by foreigners attending the congress. Papers on the typical schoolhouse and boarding schools will be read and discussed, as will also the methods of ameliorating the sanitary conditions of old quarters in town or city or of the monuments of the past, while at the same time preserving their picturesque and artistic character.

The committee having charge of affairs hopes to be able to arrange for an inquiry trip in Switzerland immediately after the congress. The general secretary of the Managing Committee is M. Albert Wuarin, 1 Rue des Moulins, Geneva.

◆

Some exceedingly handsome specimens of the metal worker's art are illustrated in a late edition of the publication entitled "American Art in Bronze and Iron," as exemplified by work executed by the John Williams Bronze Foundry, New York City. The specimens illustrated include stair railings, in connection with some of the most magnificent private residences in the country, the engravings being of large size, clearly indicating the intricacy of the work in detail. The numbers of the publication already issued relate to No. 1, Bronze Memorial Tablets; No. 2, Bank Counter Screens; No. 3, Sculpture in Bronze, and No. 4 the one at present under review. A fifth is in preparation and will illustrate and describe the many sculptured bronze entrance doors cast by the John Williams Company. The estimation in which the works are held as a record of the progress of American art in metal is evidenced by the fact that the Smithsonian Institution, Washington, D. C., has specially requested that a copy of each on publication be forwarded for the library of the Institution.

◆

New Manual Training School.

The new manual training school erected at Waltham, Mass., was formally opened on the 12th of June, when it was visited and inspected by many interested citizens. In the basement are the forge and blacksmith shop and foundry department, on the second floor is the carpenters' shop, and on the top floor are the drafting rooms and where the blue prints are made. The building is well lighted and ventilated, and the equipment is equal to all demands for a number of years to come.

The plans have just been prepared for a ten-story mercantile building, 42 x 92 ft. in plan, to be erected at 138 and 140 West Seventeenth street, New York City, to cost about $200,000.

CONTENTS.

Editorial—

Correspondence—

Novelties—

PAINTED TIN
GALVANIZED TIN

THIS IS THE AGE OF THE METAL SHINGLE.

Inflammable wood shingles, heavy slate, brittle tile and unsightly paper or tar have seen their day.

And the reason is that the NEW CENTURY METAL SHINGLE is the natural evolution of the shingle question.

They are fire proof. They are light. They are unbreakable. They are artistic—and then beyond that are qualities of durability, strength, beauty and quick adjustment—all its own.

Note the appearance of just one building roofed with NEW CENTURY METAL SHINGLES and then compare it with the cheap, common kind done in wood, slate, paper or tar.

And then figure on this—that they're cheaper than wood, cheaper than anything when you figure all the saving points involved—insurance, protection, etc.

NEW CENTURY SHINGLES are handsome embossed design, the lock is simple, easy, perfect.

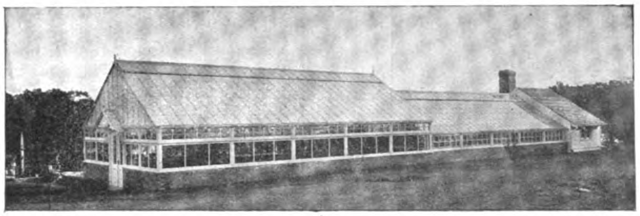
Don't fail to get the book, No. 25, we send you free, and post up on the roofing question, comparative costs, estimates, designs, etc. Address,

CHATTANOOGA ROOFING & FOUNDRY CO., Chattanooga, Tenn.

H AND Co

PERHAPS YOU HAVE A GREENHOUSE PROBLEM

on your hands—then why don't you go to greenhouse people and let them solve it for you? It's this way: Plants demand certain things—your house must meet these demands—yet still be attractive and not too expensive.
—That's our business, and we know, we know our business.



HITCHINGS AND COMPANY
Greenhouse Designers and Builders
Manufacturers of
Heating and Ventilating Apparatus
1170 BROADWAY, - NEW YORK

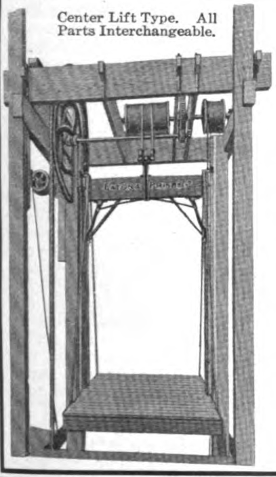
H AND Co

When It Comes To

Hand Power Elevators

Use

THE EATON & PRINCE



Center Lift Type. All Parts Interchangeable.

THEY are safe, economical, and easy to operate. Are the kind you seek and do not always find. Specify our elevators in your contracts and *please your customers.* You'll be interested in our booklet No. 50 on Safety Gates, Doors, etc. It will give you valuable information and is sent free for the asking.

EATON & PRINCE COMPANY
CHICAGO

A BOOK FOR EVERY MECHANIC

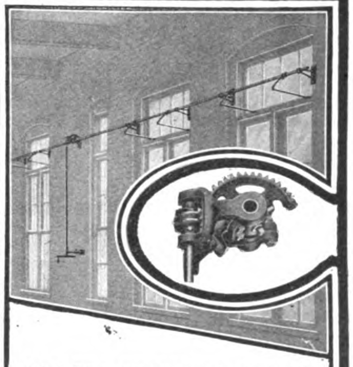
The Workshop Companion.

A Collection of Useful and Reliable Recipes, Rules, Processes, Methods, Wrinkles and Practical Hints, for the Household and the Shop.

By JOHN PHIN.

pages, 12mo, neatly bound in cloth. PRICE, 50 CENTS, POSTPAID

DAVID WILLIAMS CO. - 14-16 Park Place, New York.



NOW WHEN YOU OPERATE SASH

with a chain or cable, the thing is always a nuisance, either dangling in the way, kinking up or wearing out. With our hand wheel way of doing things you can shift one or one hundred sash from anywhere at any time.

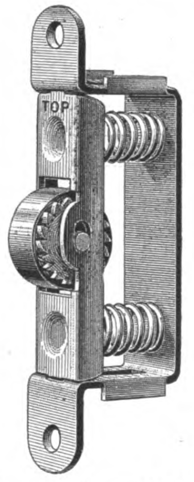
Send for Catalogue, XV Edition

LORD & BURNHAM CO.
1133 Broadway, Cor. 26th St.
NEW YORK
BOSTON BRANCH: 819 Tremont Building

NOVELTIES.

An Automatic Sash Holder.

A sash holder of special interest to architects and builders, and designed to automatically hold in any position required both upper and lower window sash without the use of sash cords, weights or pulleys, is being introduced to the trade by the Automatic Sash Holder Company, 277 Broadway, New York City. An idea of its general appearance and its application may be gained from an inspection of Figs. 1 and 2 of the engravings. The device is the result of the necessities of portable house construction, where large window frames with weight pockets were impossible and superfluous material was discarded, the above company being practically identical with the Ducker Company, at the same address, which manufactures portable houses of all kinds. The principle of this holder has been thoroughly tried out for several years in portable house construction, and now, greatly improved in every detail to satisfy more exacting conditions, is offered for permanent structures. The body of the holder requires only an easily made mortise in the stile of sash, about 3¼ x ⅞ x 1 5-16 in., all of which can be done with a ⅞-in. auger bit and chisel, mortises for new work being machine mortised at the mill. When in position the wheel runs up and down on the jamb of window frame and the holder is absolutely out of sight. The two portions of the frame are formed by special machinery from 5-64-in. sheet steel. A binding or holding friction pressure is obtained by means of two electro galvanized piano wire steel springs, which are 9-16 in. in diameter and held securely in place by large bosses stamped top and bottom in both plates. The wheel pinions, it will be seen, revolve in two elongated or oval holes with a play of about 3-32 in., so that as the sash is raised the wheel revolves, but when lifting ceases the wheel axles move upward in the slot, and the ratchets engage with each side of the upper plate sufficiently to hold the sash at any desired point. The company emphasizes some of the following advantages, viz.: that hardwaremen and others can buy them in sets of four, so as to retail profitably for less than the cost of weights, cords and pulleys; that while equally suitable for old or new construction, in the latter case there can be a great saving, both in material and freight, as well as bulk, by having window frames made without weight pockets; that owing to constant side pressure, windows, regardless of swellings or shrinkings, will always fit snugly and thus not rattle. For the average window a holder on each side of each sash up to 20 pounds will answer every purpose, they being especially suitable for residences in town or country, apartment houses, factories, cottages or any of the innumerable structures requiring windows. The holders, it may be said, have been successfully used on sash as heavy as 35 pounds each, the only objection to using them on very heavy sash being the greater strength needed to raise and lower the sash. For sash weighing 8 pounds each or less one holder on a sash is sufficient, thereby reducing the cost one-half, and for sash heavier than the average four holders could be used on each sash instead of two, if necessary.



Novelties.—Automatic Sash Holder.—Fig. 1.—General View.

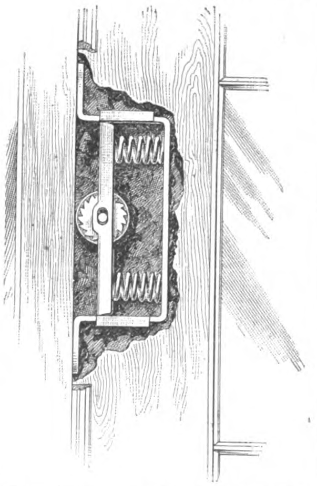


Fig. 2.—Holder in Position, with Part of Stile Cut Away.

American Automatic Knife Grinding Machine.

We present in Fig. 3 of the illustrations a general view of what is known as the American automatic self-feed knife grinder, which, it is claimed, will accurately grind any kind of a knife or bar that can be placed on a flat surface. The knife bar is so shaped that the grinding may be performed either toward or from the edge of the knife, the latter being set at any desired angle by means of a screw adjustment. The frame carrying the knife bar is pivoted to the carriage, so that the bar may be swung away from the wheel to provide easy access to the knives when changing. The feed is entirely automatic and the reciprocating movement of the knife carriage is governed by stops, so that any length of knife up to the capacity of the machine may be ground. The claim is made that the movement of the wheel to the knife can be regulated to grind from 1-3000 in. to 1-1000 in. to each back and forth movement of the knife carriage. The movement of the wheel carriage when set is automatically controlled, and the wheel will cease grinding at any point desired. The frame of the machine is of pedestal form carrying two planed ways on which the carriage slides. Four sizes of the machine are made by the American Wood Working Machinery Company, 136 Liberty street, New York City.

Excelsior Wire Wall Ties.

Among the candidates for popular favor in the way of a wall tie for bonding face brick, terra cotta, hollow walls, &c., is the Excelsior, made of wire and introduced to the trade by the Church Appliance Mfg. Company, La Salle, Ill. The claim is made that it is unnecessary to clip the brick if the Excelsior tie is used for bonding walls. The tie is made of a heavy strand of galvanized steel wire, so constructed as to form a "truss," which makes it capable of withstanding a greater strain than would otherwise be the case. Its construction is also such as to permit it to expand and contract without tearing itself loose. The tie is light, yet strong, and has proportionately a large bearing surface on the mortar. For veneering purposes the tie is said to have met with great favor on account of ease of application and rigidness. In another part of this issue the company calls attention to the merits of these wall ties, and will send to any architect or builder interested a neat little folder relating to them.

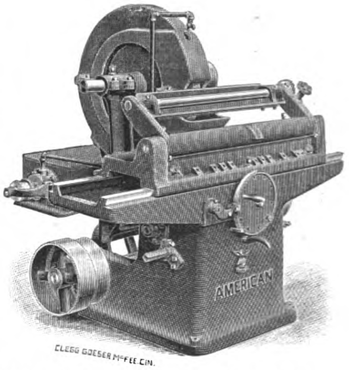


Fig. 3.—American Automatic Knife Grinding Machine.

Sanitary Flooring and Fireproof Building Materials.

A neat little pamphlet which is being sent out by the Sedgwick-Flower Company, with home office at 1135 Broadway, New York City, contains much interesting information relative to the Ideal monolith building material, which is used for sanitary fireproof floors, stairs, wainscoting, bases, &c., and for the laying of tile floors on wooden construction without the use of concrete. The statement is made that Ideal monolith consists of a dry and a liquid preparation which when combined will harden and form a mass that can be made as hard as stone or as elastic and pliable as hard wood. The most important field for the application of this material is said to be for flooring purposes. When put down in plastic shape it makes a continuous jointless floor surface, and when continued around the walls in the shape of a baseboard to a hight of 6 in. it makes a floor surface that is claimed to be sanitary, dustless and absolutely fireproof. The floor surface can be treated when finished the same as hardwood floors, and large surfaces can be laid off in squares by using colored material for borders. The entire mass of the floor surface, it is pointed out, can be furnished colored to match woodwork or other

trim so as to harmonize with local surroundings. The company manufactures a stair tread in which the tread and risers are made in one piece and have a cove corner for cleanliness. The ends rest on the stringers and the tread of one step rests on the riser of the next below to which it is firmly cemented. They are made with or without reinforcement. The Ideal monolith wainscoting is furnished in the form of slabs of any size, thickness or shape. The slabs are secured to the wall either by screws or by being cemented with the same material. Attention is called to the advantages of this wainscoting with which to remodel kitchens and bathrooms in old buildings, and the point is made that it is especially adapted for toilets, as acids do not materially affect it.


Novelties.—The New Oliver Vise.—Fig. 4.—General View.

The New Oliver Vise No. 56.

The accompanying cuts represent a vise and modifications of it put on the market by the Oliver Machinery Company, Grand Rapids, Mich. The vise has an adjustable front jaw and is made in different sizes. It is designed for the use of wood workers, including carpenters, cabinet makers, pattern makers, &c. Among the important features of the vise the following are mentioned: The casting for the main frame is substantial to insure rigidity; it is provided with 1-in. cold rolled steel guide rods; a malleable screw 4 in. long and 1½ in. in diameter, with a square thread operating through a 2-in. nut that completely encircles it, allowing, when desired, a 2-in. screw adjustment; the vise closes with a rapid action; the adjustable front jaw raised 1 in. above the bench top is full length of the back jaw, this arrangement being referred to as not indenting wood as small 1-in. dogs will, and that with this style of jaw a tail vise is not needed. Also that the vise will clamp taper, straight or circular work when used in conjunction with side clamping plate and dogs. The vise is shown in Fig. 4 with the front jaw raised to full hight and it also gives a general view of the vise. The vise in position on a bench is illustrated in Fig. 5, with maple faced jaws and a side clamping plate and dog. The vise can be furnished without a back jaw if preferred by those who desire to use the side of the bench as a back jaw. The vise as located on the under side of the bench is illustrated in Fig. 6 and it gives a correct view of the working parts. The vise is guaranteed by the manufacturer against breakage or appreciable wear for five years.

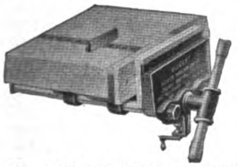


Fig. 5.—Vise in Position on Bench.

Heavy Barn, Warehouse and Fire Door Hanger.

The main frame of the hanger shown in Fig. 7 is made of one piece of heavy plate steel and is long enough to give a good bearing on the door. The wheels are extra heavy, semisteel castings, carefully centered and bored, and are provided with hard steel roller bearings and washers to make them antifriction on any length of run. The guard is adjustable to any width of track and is to prevent the hanger from jumping the track. The hanger is made by the Griffin Mfg. Company, Erie, Pa., and is designed especially for use with the Erie King track made by the company, but also can be used with the common hinge hanger track. The hanger is furnished in hard, black baking enamel finish and is packed one-half dozen pairs in a case. An end view is shown in Fig. 8.

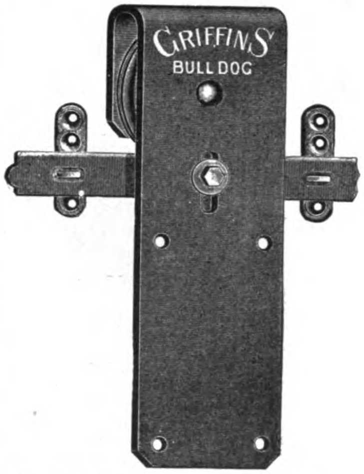
Disston Saws.

"Disston Saws" are the words which appear upon the cover of an attractive pamphlet which is being distributed among the trade by Henry Disston & Sons, proprietors of the Keystone Saw Works, Philadelphia, Pa. As the title indicates, the subject matter is saws of various kinds of the cross-cut variety. Some of these are intended for use by one man, but most of them require two men to operate. The saws which are designed particularly for felling timber have narrow blades, and the claim is made that they can be used to good advantage with a minimum amount of set without kerf-binding. Several pages are devoted to Pacific Coast cross-cut and felling saws, which have been brought out to meet the requirements of that section of the country where trees grow to enormous size and where the peculiarities of the fiber of the different woods and the method employed in logging call for a special grade of saws. Among the closing pages of the pamphlet attention is given to cross-cut saw tools, to cross-cut saw handles and to Disston files, which are made of strictly first-class crucible steel. Accompanying the pamphlet is a four-page folder relating to cross-cut saws, and especially to those appropriate for use in connection with logging operations where the timber grows to an enormous size.


Fig. 6.—Working Parts of Vise.

Edwards Metal Ceilings and Side-Walls.

In an attractively printed catalogue which has just been issued by the Edwards Mfg. Company, Cincinnati, Ohio, are a number of illustrations showing artistically modeled metal ceiling and side wall designs which are adapted to meet varying requirements. The company has just erected new factories, installed new machinery, and the employees are experienced mechanics, enabling the manufacturer to turn out a line of plates that cannot fail to command attention. The early pages are given over to suggestions about ordering goods, terms and directions for applying metal ceilings and side walls. The designs which are presented embrace the Gothic, Romanesque, Rococo, Greek, Colonial and miscellaneous. In the case of the ceiling designs the engravings are for the most part of page size, measuring 7 in. in hight by 9½ in. in length, thus indicating the detail to good advantage. In connection with the handsome illustrations are numbers for use in ordering, dimensions and prices, all of which will be found convenient for reference. In presenting these goods to the trade the company calls attention to the fact that the use of steel for ceiling and side wall decoration "is more healthful than plaster; does away with dampness in buildings incident to the use of plaster; takes a low rate of insurance; is easily applied; improves the acoustic properties of a room, and by the artistic arrangement of panels and moldings, offers possibilities of treatment hitherto unattained." The company also issues a 132-page catalogue of everything in the way of sheet metal building material, a copy of which will be forwarded to any architect or builder sufficiently interested to make application.



Heavy Barn and Fire Door Hanger.—Fig. 7.—Side View.

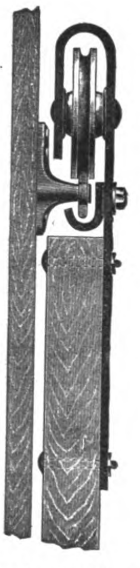
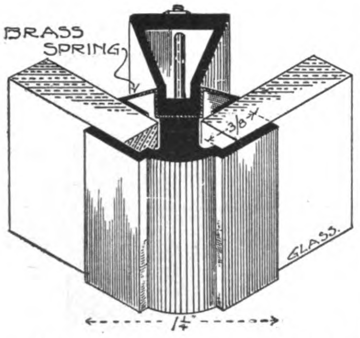


Fig. 8.—End View.

Kawneer Store Front Construction.

In presenting the new form of Kawneer store front construction the manufacturer states that in its use all exposed wood parts in window construction are obviated and no putty, felt, cork or rubber is needed. The exposed part of the construction is of solid copper, oxidized copper or nickeled. This window glass setting can be used on brick, stone or iron sills. In connection with the base all-metal corner posts, transom and division bars are provided, which are equipped with a brass spring pliable enough to hold the glass tight at all times and doing away with the use of putty, cork, felt, &c. Drainage is furnished in the spring brass gutter, which is less than ⅜ in. wide and through which also ventilation is secured. The spring brass gutter adjusts itself to any variation in the thickness of the glass. Provision is made for attaching electric lights to the back of the bars without any additional tube for concealing the wiring. The entire construction is adapted to any kind of front, whether old or new. The corner bars and base can be used together, or either can be used with any other bar or base on the market. Fig. 9 shows the corner bar, Fig. 10 the division bar and Fig. 11 the frame and base. This form of store front construction has been devised and is being placed on the market by the Kawneer Mfg. Company, Kansas City, Mo.



Novelties.—The Kawneer Store Front Construction.—Fig. 9.—The Corner Bar.

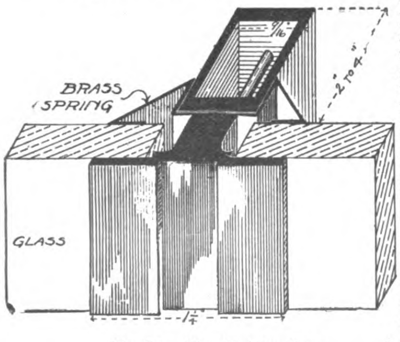


Fig. 10.—The Division Bar.

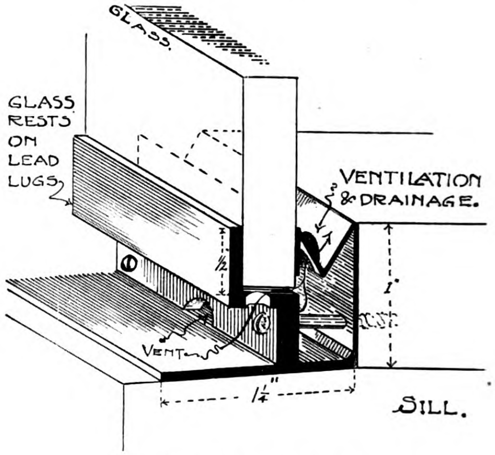


Fig. 11.—The Frame and Base.

Catalogue of Millwork and Builders' Material.

We have received from the Schaller-Hoerr Company, 413 to 426 Blue Island avenue, Chicago, Ill., a copy of a 200-page catalogue which has just been issued illustrating and describing a great variety of millwork and builders' material, such as sash, doors, interior finish, mantels, grills, hardwood flooring, stairwork, porchwork, &c. The material shown in the catalogue is manufactured in the company's large and well equipped factory which it is operating in the city. The opening pages carry directions for ordering goods, so that contracting builders at a distance can secure shipments direct. In connection with the illustrations is more or less descriptive matter, together with numbers to be used in ordering, prices, dimensions and other particulars likely to prove of value to the architect and builder. The prices given are net and subject to no further discount. The entire make-up of the catalogue is well calculated to meet the requirements of those among whom it is intended to circulate.

Parquet Floors and Borders.

The extent to which attention is being given at the present day to hardwood floors in connection with the interior finish of modern dwellings and other buildings renders of more than usual interest a handsome catalogue which reaches us from the Interior Hardwood Company, Indianapolis, Ind. The publication is entitled "Parquet Floors and Borders," and is made up of a series of illustrations in colors showing as nearly as it is possible for printer's ink to represent effects in wood, some of the many designs of floors and borders which the company can turn out. The parquetry floors consist of strips and blocks of hardwood fastened together at edges and on the backs, in slabs of convenient size for laying. They are made a solid part of the floor by being nailed to the under floor and are then finished with wax or parquet-lac, so as to highten the natural beauty of the wood. The collection of designs contained within the covers of the work under review is intended to show proper combinations of floor fields with appropriate borders, but the company states that a copy of its regular "Book of Designs," showing other patterns will be sent on request. A valuable feature in connection with the designs of floors and borders illustrated is that they are presented to a scale, thus enabling the architect and builder to ascertain exactly the sizes of the various component parts. Accompanying the catalogue is a pamphlet of pocket size relating to the same goods and giving in connection therewith the prices per linear foot for borders and per square foot for flooring. Another little pamphlet sets forth the merits of parquet-lac for treating hardwood floors.

Flexite.

The Standard Paint Company, 100 William street, New York, is giving special attention to what it calls "Flexite," a metal preservative paint. It is designed for covering all kinds of iron, steel and metal work, and is furnished in five colors. The priming coat is a cream color; then come black, red, olive and green. It is a linseed oil paint, double boiled, and the colors are full of life and are said to retain their brilliancy for three years, regardless of atmospheric condition. Specimen sheets of steel have been subjected to very severe tests. Some were subjected to the action of strong sulphuric acid fumes, some to sulphurous acid fumes and others to carbon dioxide, which, we are told, had no effect on the paint, which was also true regarding exposure to hydrogen sulphite fumes. The specimens were also submerged in 5 per cent. solutions of sulphuric acid, hydrochloric acid and nitric acid, respectively, for 12 hours, the only noticeable effect after each test being a slight darkening of the color. Other tests referred to by the company were suspension in ice water for an hour and then immediate immersion in boiling water, neither of which tests caused the paint to crack, although the films were somewhat softened and colors slightly dulled. When subjected to stack temperature (600 to 700 degrees F.) some tendency to blister was noticed, together with a slight darkening of color, but without other ill effects. This paint is especially recommended for structural iron, metal bridges, street cars, car trucks, train sheds, marine works, metal roofs, iron fences, steel smoke stacks, boiler fronts, ornamental iron work and similar surfaces.

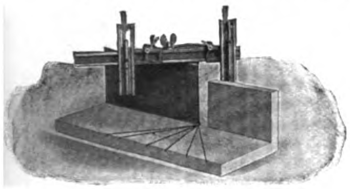
Ideal Concrete Block Machines.

We have received from the Ideal Concrete Machinery Company, South Bend, Ind., a copy of a very attractive publication illustrating by means of well executed half-tone engravings some of the many buildings constructed of concrete blocks made in the machines turned out by this concern. The illustrations for the most part

represent attractive residences in different parts of the country, but there are also small flats, churches, factories, stores, school buildings, power houses, poultry plants, &c., &c. In connection with each engraving are brief descriptive particulars, and the entire make-up of the publication is such as to render it an attractive addition to the architect's and builder's collection of trade literature.

The Victor Folding Miter Box.

The miter box shown in Fig. 12 contains a number of new features, important among which is that it may be folded flat, and this, coupled with its light weight and small size, renders it easy to carry in the carpenter's kit box or packed in his chest. The miter box has a wide range of work. Any length or width of either a back saw or panel saw can be used, and there can be cut with the box single, double or triple angles at one setting and at one operation. With a 26-in. saw a board 20 in. wide, a square, or a 17-in. wide miter can be cut. When in use the miter box is attached by means of four screws to a bench or beam, or mounted over a vise. The wooden part of the device is built by the carpenter and is screwed to the bench. In Fig. 13 the miter box is represented as folded. Among its various cuts are moldings of all kinds, shelf and finish boards of any width, compound angles on jack rafters, double and triple angles on stair balusters, as in Fig. 14; stair risers, eave troughs, dovetails, &c. In framing it is used when attached to a beam in a manner that admits of dropping long rafters down through the floor timbers until the end to be worked is in the position to be sawed. The arm carrying the saw is above the work, and consequently there is nothing with which the teeth can come in contact excepting the work. The graduated index is also above the work, making it easy of adjustment for any of the regular miters or intersection cuts. For quick adjustment to common miters a latch is provided which springs into the required notch in the graduated index plate, shown in Fig. 13, and a thumb screw riding in the slot of the index plate permits of adjustment to any angle between the regular miters, regulation miters being provided for by the latch notches. The saw guides can be raised to suit the hight of the work, and by placing the saw guides at different hights and using an auxiliary guide on the bench a triple angle may be cut. A triple angle, it is pointed out, is a rare requirement and indicates the wide range of the implement. In addition to the saw guides being adjustable vertically for cutting to any established depth they are also adjustable horizontally for the different lengths of saws. The miter box is being put on the market by J. C. McCarty & Co., 10 Warren street, New York City.



Novelties.—The Victor Folding Miter Box. Fig. 12.—General View of the Tool.

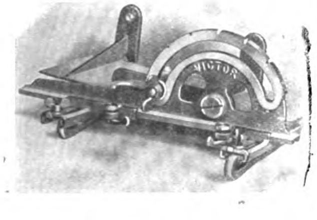


Fig. 13.—Victor Miter Box Folded.

Tests Concerning the Kahn Trussed Bar.

We have just received from the Trussed Concrete Steel Company, Detroit, Mich., a copy of an attractively printed publication of 160 pages entitled "Tests and Other Facts Concerning the Kahn Trussed Bar," manufactured by the concern in question. The little work is profusely illustrated with half-tone engravings prepared from photographs of reinforced concrete work, in connection with which the Kahn trussed bar has been used, while the descriptive particulars cover some of the more important features. Among the early pages reinforced concrete is described and the difference between Kahn trussed bar and other methods of reinforcement pointed out. The claim is made that the bar in question insures the maximum efficiency with the minimum of materials, with the natural result that from the builders' and owners' standpoint "it is the most economical method of reinforcement." The tests which are presented relate to the efficiency and economy of the form of reinforcement in question, and the various tests which have been made in different localities are illustrated and the data in connection therewith presented in shape to be readily understood and appreciated by architects and builders generally. Among other interesting information presented is a description of the Kahn system of reinforced concrete. The closing pages of the publication are given up to the names and location of some of the buildings in which the Kahn system of reinforced concrete has been recently installed. In connection with each building is given the name of the architect and the type of floors used.

New Band Rip Saw No. 180.

A machine which is claimed to embody every modern improvement in band saw construction and to stand the wear and tear of continuous service is the new band rip saw which we illustrate in Fig. 15 of the engravings. The distance between the saw and the fence is 24 in. and 12 in. under the guide. The feed rolls are placed close together, enabling short pieces to be fed successfuly. The saw guides have sectional hardwood blocks arranged to permit of taking up the slightest wear. The machine is built along the same lines as the makers' No. 1 machine, which is well and favorably known, but in addition to the superior features of the older tool it offers many striking improvements which give it a maximum of efficiency. The straining device has forward, backward and side adjustment, and the claim is made that the lightest blades may be run at the highest speed without danger to saw or operator. The saving in time and kerf is said to be very large. The machine here shown and known as No. 180 has just been introduced to the trade by the J. A. Fay & Egan Company, 221 to 241 West Front street, Cincinnati, Ohio, who will send free a circular giving full details, together with illustrations showing both sides of the machine.

New Plant of Winslow Brothers Company.

A tour of inspection of the new plant of the Winslow Brothers Company, manufacturer of architectural iron and bronze, West Houston street, Chicago, was recently made by upwards of 100 manufacturers, architects and builders. This plant is one of the largest and most complete in its line in the country, and the general arrangement reflects great credit upon the designers. Work on its erection was begun last spring, the removal from the old plant on Carroll avenue commenced in the summer and the new plant was in complete operation early in the fall. All of the buildings are of heavy mill construction and well lighted throughout, special attention having been given to this feature on account of the nature of the material manufactured. The plant comprises seven buildings, as follows: No. 1, fitting shop, 181 x 181 feet; a gallery encircles this entire building, where the smaller work is fitted. No. 2, building 86 x 181 feet, in which are situated the blacksmith shop, storeroom, shipping department and platform and lacquering room. No. 3, office building, 87½ by 141 feet, two stories in hight, the lower floor of which is given over entirely to the executive and sales offices and the drafting room, while the pattern storage department is located on the second floor. No. 4, pattern shop, two stories high, 63½ x 141 feet. No. 5, building devoted to the plating and polishing departments, containing a sand blast and Bower-Barff furnace. No. 6, foundry, 141 x 240 feet. No. 7, engine and boiler room, 50 x 91½ feet.

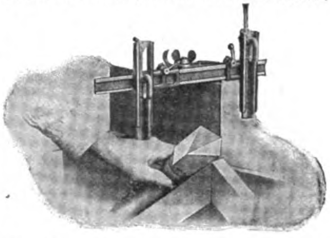


Fig. 14.—Double and Triple Angles Cut by Victor Miter Box.

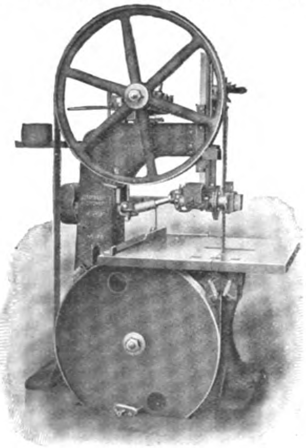


Fig. 15.—New Band Rip Saw No. 180.

TRADE NOTES.

Canton, Ohio, is the subject of a considerable number of excellent half-tone engravings in a booklet or souvenir which has been issued by the Canton Art Metal Company, Canton, Ohio. To those who are making collections of albums descriptive of the features of different cities the present publication will be found interesting. Among the many illustrations are a few characteristic views of the works of the company dispersed among the set of city views. These indicate how metal ceilings are formed, what is involved in a cornice and skylight making business where work is done on a large scale, and how sheet metal furniture is put together. The Canton Art Metal Company was formerly the Canton Steel Roofing Company, which, as will be remembered, is a manufacturer of conductor pipe, gutters, cornice, ceiling and metal furniture. A copy of the booklet will be sent to any architect or builder interested.

The Decorators' Supply Company, formerly located at 217 South Clinton street, Chicago, Ill., has recently taken possession of its new plant at Archer avenue and Leo street, where its offices are now located. Our readers will recall that this concern makes a handsome line of composition capitals for interior and exterior use, interior plastic relief work and interior and exterior composition ornaments, as well as fine grill work.

Among the more recent orders taken for its levels by the Bostrom-Brady Mfg. Company, 53½ West Alabama street, Atlanta, Ga., is one from the Isthmian Canal Commission to be used in connection with its work on the Panama Canal.

Fireproof hollow metal windows glazed with wired glass, are illustrated in a folder received from the Biersach & Niedermeyer Company, 216-220 Fifth street, Milwaukee, Wis. These windows are designed to conform with the rules and regulations of the National Board of Fire Underwriters, and are made of galvanized iron Nos. 22 and 24 gauge, or of 20-ounce copper. Pictures show various forms in which they are made, and include a view of a window which withstood a severe fire test. Among some notable buildings illustrated in which the metal windows are used may be mentioned a building of the monumental design of architecture, in which ornamental copper windows were furnished, and the building of the local street railroad power plant, which building has some automatic pivoted and hinged windows.

"A Concise History of the Lead Pencil Making" is the subject of a speech delivered in May before the members of the "Boost Club" by John A. Walker, vice-president and general manager of the Joseph Dixon Crucible Company, Jersey City, N. J. The remarks are sent out in the form of an eight-page pamphlet and will be found especially interesting to all having occasion to use a lead pencil, as there are probably few today who fully understand the various processes through which a pencil passes from the wood in the tree to the completed article. The company is also distributing a little pamphlet entitled "Unions for Steam Pipes," being an illustrated description of the several varieties of unions, with valuable suggestions concerning them, by W. H. Wakeman, an expert steam engineer and author of well-known books on steam engineering. The pamphlet is a reprint from Dixon's house organ, *Graphite,* and the company will be glad to send a copy free of charge to any one interested in steam pipes.

Those who have occasion to make use of hand power elevators are likely to be interested in the announcement presented in another part of this issue by the Eaton & Prince Company, Chicago, Ill. This concern makes a line of elevators of the character indicated, which are referred to as safe, economical and easy to operate. In the central lift type all parts are interchangeable and the construction is such as to give satisfaction to those using it. Some interesting information will be found in booklet No. 50 relating to safety gates, doors, &c., a copy of which will be sent free to any address on application.

An idea of the extent to which the telephone is at present being used in the metropolis may be gathered from the fact that in the latter part of June about 200 men employed by the New York Telephone Company, 15 Dey street, New York City, began the work of delivering the new summer telephone books and collecting the old ones. The new directory contains the names of over a quarter of a million of New York's most progressive business houses and individuals, and 365,000 copies of the book are being distributed. The book requires about four weeks to complete and means the handling of about 800 tons of paper, since the old books are taken away when the new ones are left. Originally the telephone book was used only for the purpose of looking up telephone numbers, but at the present time the list of telephone subscribers in New York City is so complete that the telephone directory has become an excellent general directory of New York and vicinity, and is highly accurate, since it is revised and a new issue distributed every four months. In June of the current year the total increase in the use of telephones in New York City was 3591, as against a gain of 2217 in June of last year.

The contract for the fireproof windows for the 22-story office buildings now being erected by the Union National Bank at Fourth avenue and Wood street, Pittsburgh, Pa., has been awarded by the Building Committee to the S. Keighley Metal Ceiling & Mfg. Company, of that city. This contract calls for about 500 Phœnix fireproof windows made exclusively by the company named, and was awarded, we are advised, entirely on the merits of the window, prices being a secondary consideration. The Phœnix window has been installed in some of the larger office buildings throughout the country, and although on the market only about a year has been steadily gaining in popularity on account of its adjustable pulley stile permitting the window to be easily operated at all times, and also because of its many other advantages.

The fire protection advantages attending the use of metal in building construction were demonstrated in the Kohl Building at San Francisco. As already pointed out, this was one of the buildings in which the offices were not entirely burned out. The building was not only equipped with metal window frames, but the Berger Mfg. Company, Canton, Ohio, furnished steel furring and studding for the interior partitions, which were found to be largely instrumental in preventing the extension of the fire in the building and in saving the equipment in many of the offices.

We have received from the Stephenson Mfg. Company, South Bend, Ind., a copy of "Catalogue D," illustrating the leading lines of turned work which it is prepared to furnish. Outline drawings are presented of pointed and spiral grooved dowel pins, table pins, turned moldings and automatic lathe turnings. All the patterns are shown full size and in connection with each is a number to be used in ordering goods. Several of the opening pages are devoted to an index, which is unique in that it consists wholly of numbers. The name of the concern, which fills the entire first page of the cover, is composed of letters made of turned work, while the last page of the cover carries a bird's-eye view of the company's extensive plant.

The American School of Correspondence, Chicago, Ill., calls attention in its page advertisement this month to a new work for carpenters and builders. It is pointed out that it is something entirely new—not a revision—and that it will be found invaluable to draftsmen and architects as well as carpenters and contractors who desire to learn how to proportion columns, cornices, gables, balustrades and other details in the various styles of architecture, such as Doric, Ionic, Corinthian, &c. The work consists of one large volume of text, 442 pages, 7 x 10 in., substantially bound in half red morocco leather and a handsome portfolio of 58 working plates, 11 x 15 in., carefully drawn to scale and printed on heavy plate paper convenient for reference. The work also contains a comprehensive glossary of architectural terms, together with the pronunciation and definition. The books are compiled from the best instruction papers of the school, and in order to acquaint the readers of *Carpentry and Building* of the value of the instruction in architecture pursued by the school in question it will for a limited time reduce the price and send the books on special terms, details of which will be found in the advertisement.

The June issue of the *Advocate,* published by the Cortright Metal Roofing Company, Philadelphia, Pa., contains the usual amount of interesting comment relative to the good qualities of Cortright metal shingles and of roofs which are covered by them. In addition to the technical information contained is more or less light reading of a humorous character and likely to command the attention of many even though not specially interested in the subject of roofing.

We have received from the W. C. Toles Company, Irving Park, Chicago, Ill., an attractive 36-page catalogue of rapid acting vises for wood workers and manual training benches, which are specialties with the concern named. Various styles of the vises are presented, together with descriptive particulars and testimonial letters from some of those who have practically demonstrated the merits of the devices. Many of the illustrations are half-tone engravings representing views in manual training schools, while the matter considered in its entirety is arranged with a view to meeting the requirements of those interested in goods of the character named.

The merits of the Osborne blind and transom adjuster are strikingly set forth in a daintily printed pamphlet sent out by the Osborne Blind Adjuster Company, 56 Harrison avenue, Springfield, Mass. The blind adjuster consists of a small wire chain, the extremes of which extend on the inside of the building and which operates a sprocket on the outside, to which is attached a worm operating a gear connected to an arm extending the entire width of the blind. By drawing on one end of the chain the blind can be opened to any desired distance, while the reverse chain is drawn for closing. The mechanical parts are fastened to the outside casing and securely protected by metal coverings so that they are waterproof. The claim is made that the blinds are easily operated, and that there is no necessity of raising windows or screens, while all dangers accompanying the old method of opening or closing blinds are eliminated. The transom adjuster is practically the same as the blind adjuster, with a few minor alterations. It can be attached conveniently to either edge of the door casing and is automatically locked the moment the chain ceases to be drawn.

The Senour Mfg. Company, Chicago, Ill., and Montreal, Canada, is distributing a four-page folder setting forth the merits of what is known as Senour's Fil-Krack, for filling cracks, crevices, open joints, holes, slivered or broken places and other defects in wooden floors or in any kind of woodwork. The material is put up separately in powder and in liquid forms, the latter to be used with the former in making a paste for filling the cracks. The claim is made that it will stand the heat and cold without shrinking from the surrounding surface, and can be painted, varnished, waxed, scraped or polished the same as the wood. Directions for using the material are given on the folder, together with prices and the sizes of the packages in which it is supplied.

The capital stock of the Hollow Concrete Block & Construction Company, Edwardsville, Ill., has been increased to $25,000 and the name changed to the Morriss Lumber & Construction Company. An office building is being erected on Nineteenth and E streets, concrete blocks being used for the work. The officers of the new company are: President, A. W. Morriss; vice-president and general manager, R. A. Morriss, and secretary, A. S. Morriss.

Carpentry and Building
WITH WHICH IS INCORPORATED
The Builders' Exchange
PUBLISHED MONTHLY

To all parts United States, British America and Mexico, - $1.00 Per Year
To all other Countries, - - - - - - - - 1.25 Per Year
Advertising Rates on Application.

BUSINESS OFFICES.
NEW YORK—David Williams Company, Publishers..........14-16 Park Place.
PHILADELPHIA—S. S. Reckefus, Manager..Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—Walter C. English, Manager..........Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. Walker, Manager..........Park Building, 357 Fifth Avenue.
CHICAGO—A. A. Ainsworth, Manager..........Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—Henry Smith, Manager..........Pickering Building, Fifth and Main Streets.
CLEVELAND—Ezra S. Adams, Manager..........The Cuyahoga, 311 Superior Stre
ENTERED AT THE POST OFFICE, NEW YORK, AS SECOND-CLASS MATTER.

This is our New Ware House

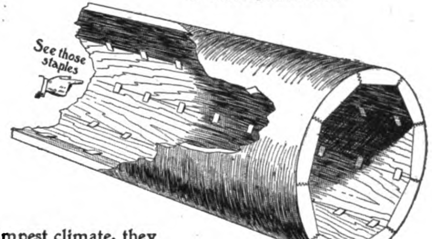
50 x 50 feet, three floors.
Capacity, 7000 columns.

All orders for columns in stock sizes shipped same day as received.

Cut of Staple is three quarter size.

THEY CANNOT OPEN AT THE JOINTS.

Columns are glued up under enormous pressure and then the staples are driven in as shown in illustration by our special machinery.



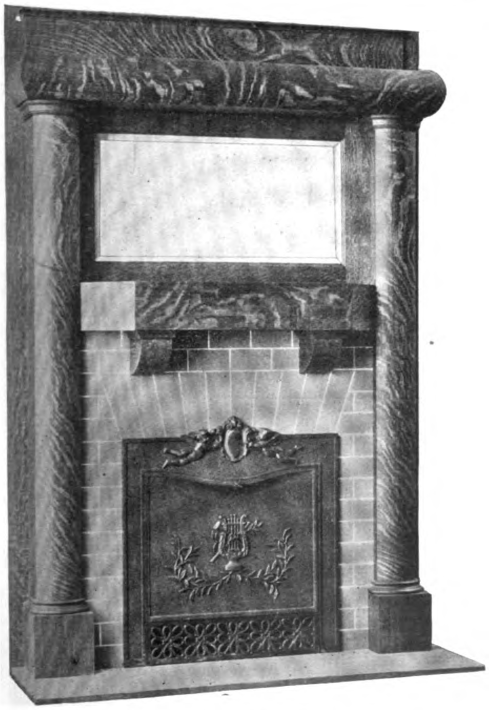
FREE OFFER On Receipt of Postal saying where you saw this Adv. we will send you postage paid a Sample Section of this Column showing the wonderful Lock Joint.

Put them where you will, in the hottest room, the driest or dampest climate, they
POSITIVELY WILL NOT OPEN. WE GUARANTEE IT.

Made only by

AMERICAN COLUMN COMPANY, BATTLE CREEK, MICH.
DON'T TAKE SUBSTITUTES.

Patented in United States and Canada.



GET IN TOUCH WITH "THE MANTEL FOLKS"

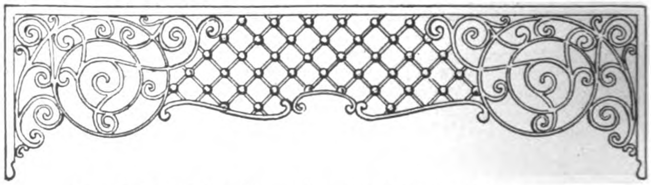
IF	GOOD DESIGNS
YOU	RIGHT PRICES PROMPT SHIPMENTS
WANT	PERFECT SATISFACTION

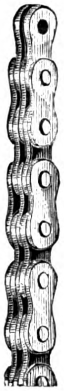
If you have never done business with us, we want you to write us TO-DAY concerning present or future mantel needs and we shall be pleased to send you our catalogue with best prices, FREIGHT PREPAID TO YOUR STATION. Send us a trial order and see what our goods are like. YOU'LL NOT BE DISAPPOINTED.

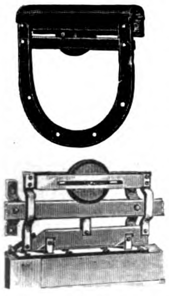
If we can save you money,
You want to know it, don't you?

The A. W. Burritt Co., 400 Knowlton St.,
"The Mantel Folks," Bridgeport, Conn.

No. 0575.







Lane Barn Door Hangers

Give best satisfaction. We are the originators and largest makers of U-shape hangers.

"LANE'S STANDARD"

is the original steel single rail . . PARLOR DOOR HANGER

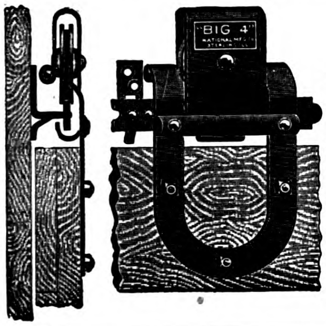
The most popular hanger to-day—because it is *all* steel and substantially and well built on correct mechanical principles.

—IT GIVES SATISFACTION.—

Sold by Hardware Trade. Send for circulars to

LANE BROTHERS CO.,

423-455 Prospect St., - - - - POUGHKEEPSIE, N. Y



"BIG 4" FLEXIBLE DOOR HANGER.

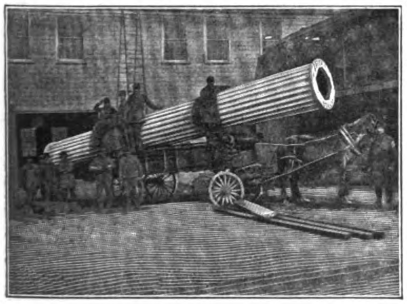
Anti-Friction. Cannot Jump the Track. Exclusive Sale Given.

NATIONAL MFG. CO., STERLING, ILL.

Grand Rapids Wood Carving Co.,

GRAND RAPIDS, MICH.

Catalogue on application.



THE LARGEST LOCK JOINT COLUMN EVER BUILT.

40½" in diameter, 33-10 in. long

One of four furnished by us for the Portico of the Allenhurst Club, Allenhurst, N. J.

HARTMANN .BROS. MFG. CO.

Mt. Vernon, N. Y., U. S. A.
New York Office: 1123 Broadway.
Also
Henry Sanders Co., Chicago, Ill.
A. J. Koll Planing Mill Co.,
Los Angeles, Cal.

MANUFACTURERS OF
KOLL'S PATENT LOCK JOINT COLUMNS FOR PERGOLAS, PORCHES OR INTERIOR USE.

Send for Catalogue D 19.

GRILLES "Direct from Factory" MANTELS

No. 225—48x12 inches, **$3.60.** Retail value, $7.00

No. 230—48x14 inches, with Curtain Pole, **$4.50.** Retail value, $9.00.

Others from $2.50 up. Largest assortment. Division Screens and special Grilles to order.

Tile and Mosaics for everywhere. Walls, Floors, etc.

$13.25 buys this solid oak Mantel, 80 in. high, 54 or 60 inches wide, 28 x 16 Mirror. Heavy columns and elaborate capitals. Tile facing and hearth with Plated Frame and Club House Grate, $10. extra.

HARDWOOD FLOORS

will last as long as the house. Any carpenter can lay it easier than ordinary flooring. Get our prices.

Write for catalog of Mantels, Grates, Tiles for floors and baths, Slate Laundry Tubs, Grilles, etc. It is free. Or send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from **$12** to **$200.**

W. H. OSTENDORF, - - - - - - - 2923 N. Broad St., Philadelphia, Pa.

King's Automatic Weather Strip. Window and Door Stop.

The only perfectly satisfactory weather strip, window and door stop on the market.

Keeps out cold and dust.

Makes a perfectly tight joint.

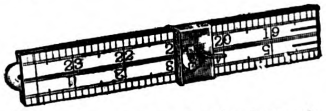
Windows can be raised and lowered to desired position without the use of fasteners or of weights.

Do not build a house until you have investigated the merits of these strips.

Write for prices.

MANUFACTURED BY
The King Manufacturing Co.
Newton, Ia.

The Handy Rule Gauge



It clamps on any standard two-foot rule, and can be adjusted or removed in an instant.

A great convenience to carpenters, and has many uses.

Sold by the hardware trade.

Price, 15c.

CALDWELL MFG. CO.,
5 Jones Street, Rochester, N.Y.

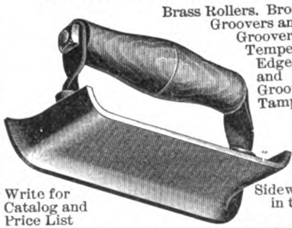
GRINDSTONES.

Mounted Grindstones for Carpenters' or Anybody's Use.

THE CLEVELAND STONE CO.,
6th Floor, Hickox Bldg. CLEVELAND, O.

Try "Best" Spring Tempered Steel Edge Groovers and Center Groovers

Brass Rollers. Bronze Edge Groovers and Center Groovers, Spring Tempered Steel Edge Groovers and Center Groovers, Iron Tampers, etc.



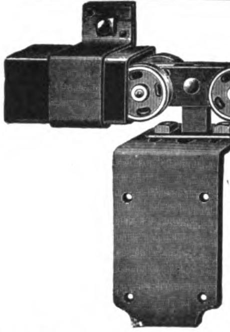
The Most Satisfactory Cement Sidewalk Tools in the World

Write for Catalog and Price List

The Woodhouse Hdw. Mfg. Co.
2620 So. 13th St., St. Louis, Mo.

Forest City Bit & Tool Co., Rockford, Ill., U.S.A

Manufacturers of Wood Boring Bits, Hollow Mortising Chisels, Common Mortising Chisels and Tools Send for CATALOG "G" Send for



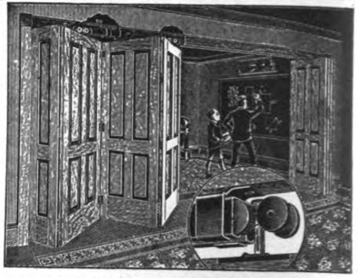
No. 20
Standard
Trolley
Roller-
Bearing
Barn
Door
Hanger

RICHARDS
DOOR HANGERS
are the best.

Made for sliding doors of all sizes and weights.

Popular with architects and builders.

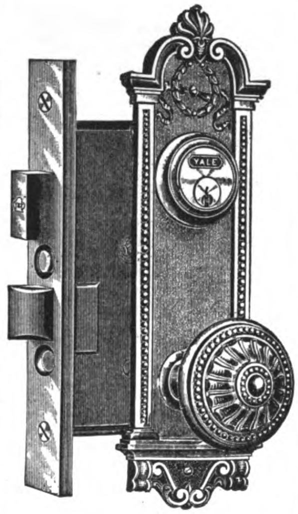
Sold by dealers.



No. 135 Ball-Bearing Swivel Door Hanger for folding doors. Vertical Adjustment.

The Richards Mfg. Co., Aurora, Ill.
New York Office, 101 Reade St.
Send for Catalogue of Door Hangers, Fire Door Fixtures, Conveying Systems.

MRG
TRADE MARK



Selecting Good Hardware

Builders' Hardware is subjected to more constant wear than any other thing that enters into the construction of a building. Too often it is selected because of low price and present appearance without regard to real quality. The to-morrow of the house you build will speak of your judgment as to-day it speaks of your skill. Second grade hardware soon shows the wear by loosened door knobs, worn finishes, hard-working locks and broken parts.

Yale & Towne Locks And Builders' Hardware

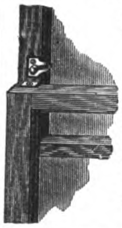
are known the world over for their wearableness, their security and their beauty. They have a reputation among the trade of being better made, and made from better material.

Any of these 300 designs can be ordered through your hardware dealer.

Write for a handsome card portfolio which shows a dozen of our popular designs in ornamental hardware.

THE YALE & TOWNE
Manufacturing Company
9 MURRAY ST. NEW YORK

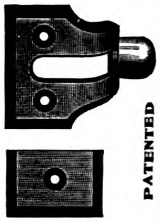
SPECIAL OFFER TO CARPENTERS
BUILDERS AND OWNERS OF HOMES

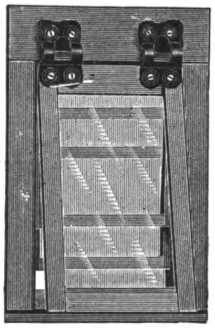


Ives Patent Window Ventilating Lock, a Safe-Guard for Ventilating Rooms, Pure Air, Good Health and Rest Assured.

To introduce this article, Four Ventilating Locks in genuine Bronze, Brass or Antique Copper Finish will be mailed to any address prepaid for One Dollar. Will include a forty page Hardware Catalogue and Working Model to Carpenters who wish the agency to canvass for its sale. Address

THE H. B. IVES CO. NEW HAVEN. Conn., U. S. A.





Full-length window screens keep out all the flies and protect the windows. Screens attached with

GOSSETT'S
Detachable Suspension
HINGES

are easily put up or removed—no tools or ladder necessary. Write for free sample pair. Price per Doz. pairs $1.20 (Express paid), Sold by Hardware and Lumber Dealers.

Manufactured by
F. D. KEES MFG. CO. Beatrice, Nebr.

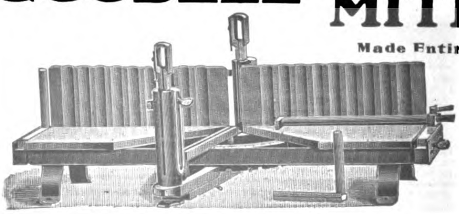
LATEST DESIGNS IN

Builders' Hardware

Our new Catalogue sent Free to Contractors and Material Men upon request.

REHM HARDWARE COMPANY
354 Blue Island Ave., Chicago

GOODELL MITRE BOX



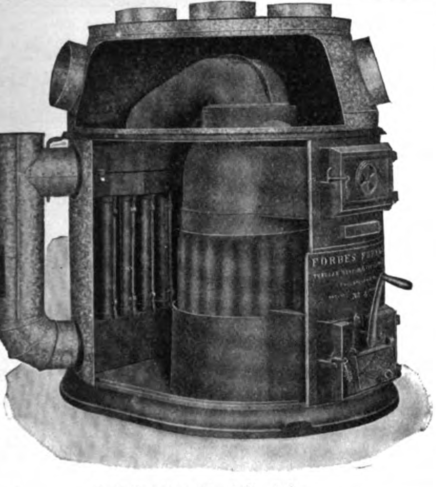
Made Entirely OF STEEL.

No More Breaking.

Most desirable Box on the market, being way ahead in quality and improvements.

Send for Folder.

GOODELL MFG. CO.
GREENFIELD MASS.



Height over all, 4 ft. 3 in.

THE FORBES FURNACE

Burns Either Hard or Soft Coal

EVERY ONE GUARANTEED
IF PROPERLY INSTALLED

No Sheet Iron Drums—Entirely Cast Iron
—Radiating Drums 1-8 Inch Thick,
Will Wear for Years

YOU RUN NO RISK IN PUTTING IN THE FORBES FURNACE

SEND FOR CATALOG AND FULL PARTICULARS

Tubular Heating & Ventilating Co.
228 Quarry St., Philadelphia

The Carpenter and Builder who *insists* that the local dealer furnish heating apparatus marked "made by the

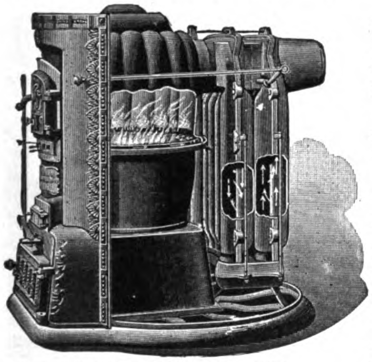
INTERNATIONAL HEATER CO.,"

will never be in hot water himself. This "F" series HOT WATER HEATER invariably gives satisfaction.

UTICA, N. Y.

New York. **Boston.** **Chicago.**

THE BEST IS THE CHEAPEST



The BENGAL FURNACE

has stood the crucial tests imposed upon it in various places and always came out the victor.

The best evidence of its superiority is that imitators are trying to sell their wares on the merits of the BENGAL, saying it is "just as good."

There are none "just as good."

Full particulars on application.

THE FLOYD-WELLS CO., - Royersford, Pa., U. S. A.

$49

LEADER

Steel Furnace

THIS No. 45 Leader Steel Furnace will heat uniformly a 7 or 8 room house, a good sized store, a school, or small church. It is durable, strong, compact. Has steel body with galvanized iron casing. Works easily with coke, hard or soft coal or wood. Has brick fire box. It costs $49, freight paid, east of Omaha. We furnish also plans of your house so you yourself can set up the furnace with its pipes, registers, smoke pipe, etc. Hundreds of people have done it—you can. Write for our new illustrated instruction book on furnaces, "Modern Furnace Heating." It's free. It's valuable. Do it now.

HESS WARMING &
VENTILATING CO.,
709 Tacoma Building,
CHICAGO, - ILLINOIS.

50% SAVED

OAK VENEERED DOORS IN STOCK ALL SIZES.

$ $ $ $ $ $ $

$ $ $ $ $ $ $

MADE IN STOCK QUANTITIES, SOLD AT STOCK PRICES, CARRIED IN STOCK

THE FOSTER-MUNGER CO.
AMERICAS GREATEST SASH & DOOR HOUSE
CHICAGO, U·S·A·
WRITE FOR VENEERED DOOR BOOK 1448 A

When you buy

ECCENTRIC CLAMPS

specify

COLT'S

There is a difference—let us tell you
Ask for catalogue No. 129.

BATAVIA CLAMP CO.,
23 Center Street, BATAVIA, N. Y.

WORTHLEY'S
PATENT

SLOW FEED MANGER

17-Inch Size, $1.60 each.

U are welcome to a copy of our
VANE CATALOGUE

BROAD GAUGE IRON STALL WORKS,
53 Elm St., Boston, Mass.

MANY TIMES

we are asked if we have small pamphlets or circulars covering some particular line of Tools or Hardware which we can send in place of a large and expensive catalogue. For this reason we issue the following catalogues, each complete in itself:

TOOLS

No. 1959	Glue and Varnish Brushes.
" 1960	Imported French Band Saws.
" 1961	Work Benches.
" 1962	Hand Screws, Clamps, etc.
" 1963	Mitre Boxes, Trimmers, etc.
" 1964	Files and Rasps.
" 1965	Saws.
" 1966	Planes.
" 1967	Tool Chests.
No. 1968	Adjustable Circular Saw Vise.
" 1969	Goodell "All Steel" Mitre Box.
" 1970	Roe's Patent Angle Steel Pocket Tape.
" 1971	Yankee Tools.
" 1972	Universal Square.
" 1973	Wood Carver's Tools.
" 1974	Automatic Mitre Clamp.

HARDWARE

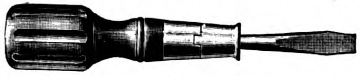
No. 1975	Sliding Door Rail and Sheaves.
" 1976	Storm Sash Hangers and Fasteners.
" 1977	Stamped Stationary Drawer Pulls.
" 1978	Blount Door Checks.
" 1979	Corbin Door Checks.
" 1980	Bardsley Door Checks.
" 1981	Bommer Spring Hinges.
" 1982	Glass Knobs.

Copies may be had by application, but above numbers must be specified.

HAMMACHER, SCHLEMMER & CO.,
HARDWARE, TOOLS AND SUPPLIES
NEW YORK, SINCE 1848.
4th Avenue and 13th Street. (Block South of Union Square.)

TOWER'S CHAMPION SCREW DRIVERS

FOR SIXTEEN YEARS THE ACKNOWLEDGED STANDARD.



Every Blade Is Tested to Split a Screw Head.

AVOID Imitations of CHAMPION Screw Drivers. None Genuine without the name "CHAMPION" which is our Trade Mark and Guarantee.

TOWER & LYON CO.
95 Chambers Street, New York.

"Forstner" Brace and Machine Bits

For Fine Carpenter, Cabinet and Pattern Work

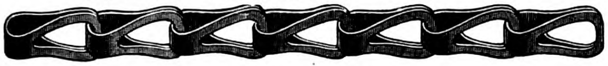
Specially Adapted for Hardwood Working.

The Forstner Labor-Saving Auger Bit, unlike other bits is guided by its *Circular Rim* instead of its centre; consequently it will bore any arc of a circle and can be guided in any direction regardless of grain or knots, leaving a true polished surface. It is preferable and more expeditious than chisel, gouge, scroll-saw, or lathe tool combined, for core-boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon moulding and mortising, etc.

To introduce this high grade tool among carpenters, pattern makers, and others, we will mail to any reader of "Carpentry and Building," upon receipt of 50c. any bit we make from ¼ inch to 1 inch in size.

Manufactured by
The Progressive Mfg. Co., Dept. "A", Torrington, Conn.
Enquire of your Hardware Dealers or write us direct. Supplied in Sets. Write for Catalogue.

SASH CHAIN



CABLE CHAIN

JACK CHAIN

The SMITH & EGGE MFG. CO.
Bridgeport, Conn.

Manufacturers of "**Giant Metal**" **Sash Chains**
" " "**Red Metal**" " "

Cable Chains, Jack Chain, Bell Hangers' Chains and Plumbers' Chains
Made in Brass, Copper and Steel

WRITE FOR CATALOGUES AND PRICES

We are the ORIGINATORS of SASH CHAIN as a SUBSTITUTE for sash cord

HARGRAVE'S WOOD DRILLS ARE BEST

Made of the best material, forged and not milled. Especially adapted to hard wood, and will not be injured by coming in contact with a nail or screw, and having a longer point, cuts much faster than a metal drill. Bores a smooth hole in any direction; will not split the wood nor turn aside from the grain or knots. Speed and feed are entirely under the control of the operator.

QUALITY, FINISH, DESIGN.

Specify these goods to your dealer.
TAKE NO OTHER.
Send six cents for cat. No. 200.

The Mark of Quality **HARGRAVE**

THE CINCINNATI TOOL CO.,
Norwood, CINCINNATI, O.

THE AKRON ECLIPSE LEVELS Manufactured by The **BAKER McMILLEN CO.**
AKRON, OHIO.

We have a proposition that will interest every carpenter. Drop us a postal and we will send it to you.

PRACTICAL USES OF THE STEEL SQUARE. Vol. I.
242 Pages. 177 Illustrations. Cloth Bound. $1.00.

PRACTICAL USES OF THE STEEL SQUARE. Vol. II.
230 Pages. 160 Illustrations. Cloth Bound. $1.00.

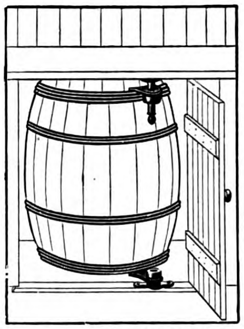
Every carpenter needs to acquaint himself with the remarkable and varied results obtained by the use of the steel square. These two volumes furnish a very full treatment on the application of the instrument.

THE UPTODATE HARDWOOD FINISHER.
209 Pages. 117 Illustrations. Cloth Bound. $1.00.

Gives rules and methods for working hardwoods, the tools required and their care, choosing hardwoods for various purposes, veneering, the use of glues, &c. Treats on filling, staining, varnishing, polishing, gilding, enameling and finishing all kinds of woodwork. In fact, all processes involved in wood finishing are clearly explained.

David Williams Company
Publishers and Booksellers
14-16 Park Place,
New York.

HERE'S SOMETHING



that every housewife appreciates on sight, it's to swing the flour barrel under the shelf or in the cupboard. To dip flour, simply swing the barrel out.

THE PERFECTION BARREL SWING

adjusted to any barrel in a moment, simplest method of fitting up the pantry cupboard, a handy fixture for a hardware or grocery store.

ASK YOUR DEALER FOR THEM, OR SEND TO US.

The Leavitt Machine Co., Orange, Mass.

Will Not Bend.

Hardened and Tempered.

30 in. and 36 in. long.

DEMAND one with our name on it, and have the BEST.

KRAEUTER & CO.
NEWARK, N. J.

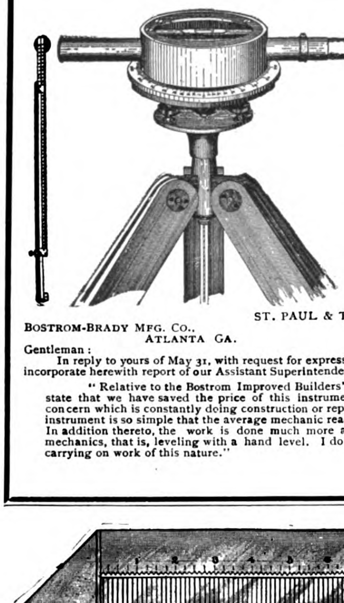
Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

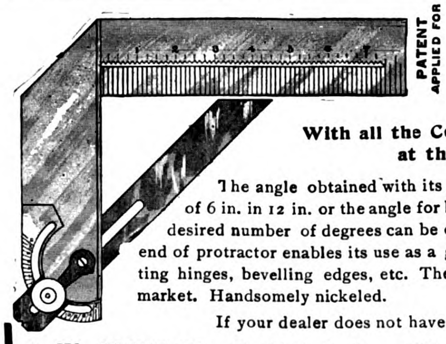
Union X4 Iron Smooth Plane.

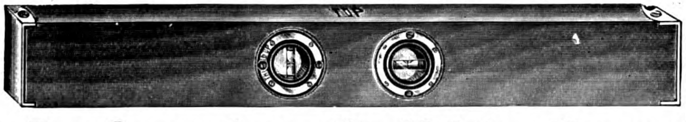
Union X35 Wood Smooth Plane.

Union No. X5 Iron Jack Plane.

Union No. X26 Wood Jack Plane.







The Carpentry and Building Series of Designs

Comprises four books, each complete in itself and sold separately. Every Volume has two hundred or more pages, elegantly printed and bound in heavy paper with tasteful cover designs.

The titles and range of cost:

No. 1

COTTAGE DESIGNS WITH CONSTRUCTIVE DETAILS, 600 to 1,500 Dollars and upward. **Price, $1.00.**

No. 2

LOW COST HOUSES WITH CONSTRUCTIVE DETAILS, 750 to 2,500 Dollars and upward. **Price, $1.00.**

No. 3

MODERN DWELLINGS WITH CONSTRUCTIVE DETAILS, 2,000 to 5,000 Dollars and upward. **Price, $1.00.**

No. 4

SUBURBAN HOMES WITH CONSTRUCTIVE DETAILS, 3,000 to 10,000 Dollars. **Price, $1.00.**

The contents include full-page half-tone views, floor plans and constructive details of selected examples of suburban homes such as are being built at the present time.

These books afford a most pleasing variety of designs and will prove suggestive and useful to architects, builders and contractors, as well as to all who have an interest in the idea of home building.

$1.00 each, Postpaid

David Williams
Company
PUBLISHERS
14-16 Park Place
NEW YORK

We Don't Mean to Boast And Really We Don't Have To.

Below is a sort of condensation of many unsolicited opinions from almost every country on earth:

"The most complete work on WoodWorking Machinery, Tools and Supplies ever published."

"A recognized authority on Metal Working Tools, Machinery and Supplies."

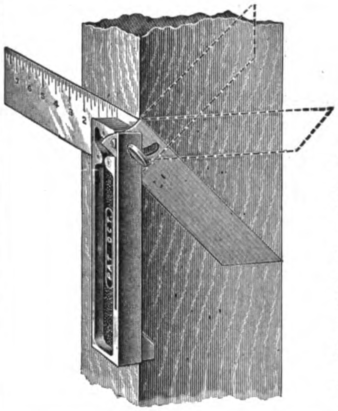
Send 25 cents for either of these books to

The CHAS. A. STRELINGER CO.,

Publishers of the Catalogues and Suppliers of the best of everything in Tools, Machinery and Supplies.

Box B. DETROIT, MICH., U. S. A.

SOMETHING NEW



Ideal Bevel Try Square

By having this combination try square you save time, also the price of one tool. You can see by cut how easy it is to change the bevel blade to any desired position to make the square and bevel cut with one stroke of the pencil.

NICHOLLS MFG. CO., OTTUMWA, IOWA.

THE FOX SQUARE AND MITER IMPROVED

Can be adjusted from 5 to 8 ins.
A whole set of Squares in one.

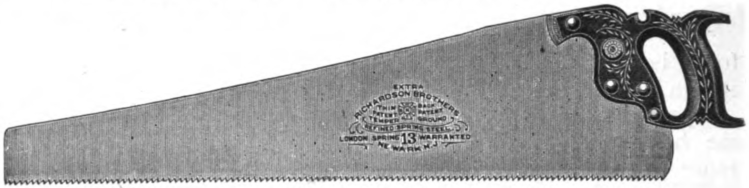
This tool with sliding and detachable blades is the best and most complete Square and Miter on the market.

FOR SALE BY ALL HARDWARE DEALERS.

SEND FOR FOLDER.

P. L. FOX, M'f'r,
432 William Street - BRIDGEPORT, CONN.

OLD RELIABLE RICHARDSON SAWS.



ESTABLISHED 1860.

The peer of them all. Try one and be convinced. Every saw fully warranted.

NATIONAL SAW CO. Operating Richardson Bros. **NEWARK, N. J.**

Quality Tells

WHEN HENRY DISSTON WAS ASKED THE QUESTION: "WHAT DO YOU PUT IN YOUR SAWS?"
HE REPLIED: "GOOD STEEL AND HONEST WORK."

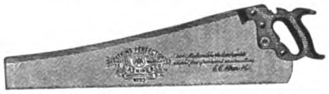
UPON THIS FOUNDATION IS BUILT DISSTON QUALITY.

"If you want a saw it is best to get one with a name on it that has a reputation. A man who has made a reputation for his goods knows its value as well as its cost and will maintain it."

ESTABLISHED
1840

HENRY DISSTON & SONS, Inc.
PHILADELPHIA, PA.

ATKINS HIGH GRADE SILVER STEEL SAWS



Do more work and do it easier than any other. Because they're made right—by men that know how—Our name on every blade. Ask your Dealer for an Atkins.

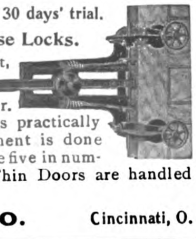
E. C. ATKINS & CO., Inc.,
Home Office and Factory, - - - **Indianapolis**

BRANCHES: Atlanta, Chicago, Memphis, Minneapolis, New Orleans, New York City, Portland, Seattle, San Francisco, Toronto.

Miller's Hand Mortiser

PRICE $12.00. $4.00 with order, balance after 30 days' trial.

Its Work is to Make Openings in Doors for Mortise Locks.



The time is Three Minutes. The Material is Hard, Soft, Cross Grained and End Wood.

The job is Clean, True and Parallel with Sides of Door. The Labor is Performed with slight exertion. The care is practically none, as the tool does not get out of order. The adjustment is done in a moment's time for the different sizes. The cutters are five in number, and cover locks from 1 2 to 1 1-8 inches thick. Thin Doors are handled as easily as Thick Doors.

Riverside, Cal. **A. W. MILLER MFG. CO.** Cincinnati, O.

House Hints

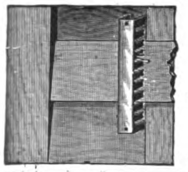
FOR THOSE WHO BUILD, BUY, IMPROVE OR RENT.

Sets forth many things for your careful consideration, beginning with the choice of site and taking up constructional features, house fittings and furnishing.

Second edition, enlarged. A pamphlet of 55 pages. Size 6 x 9 inches.

FIFTY CENTS, POSTPAID

DAVID WILLIAMS COMPANY
14-16 Park Place, New York.



NEW

CLAP-BOARD MARKER.

Cheaper and better than any on the market.

Countersink and Depth Gauge.

Send for circulars, or ask your Hardware Dealer for them.

OTIS A. SMITH, Rockfall, Conn.

"THROUGH FRISCO'S FURNACE"

A Souvenir Book of Views Showing High Buildings in San Francisco which had their Steel Work Preserved from Rust with

DIXON'S SILICA-GRAPHITE PAINT

WRITE FOR FREE COPY No. B—32.

JOSEPH DIXON CRUCIBLE CO., Jersey City, U. S. A.

W. R. OSTRANDER & CO., 22 Dey Street, New York City,

Manufacturers of

Speaking Tubes, Whistles, Elevator, House and Hotel Annunciators and Bells, Electric Light Supplies.

Send for Catalogue.

Factory, 1431-1439 DeKalb Avenue, Brooklyn.

"Yankee" Tools.

No. 11.—RATCHET, RIGHT AND LEFT HAND AND RIGID.

No. 15.—RATCHET, WITH FINGER TURN ON BLADE.

No. 30.—SPIRAL RATCHET, RIGHT AND LEFT HAND AND RIGID.

The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up to date mechanic could buy tools of their quality and character. Other tools are very good tools, but "Yankee" Tools are better. "Yankee" Tools are sold by all leading dealers in Tools and Hardware. Ask your dealer to see them. Our Yankee Tool Book tells all about them. Sent free by

NORTH BROS. MFG. CO., Philadelphia, Pa.

A TOOL THAT'S STAMPED

STANLEY

IS THE BEST OF IT'S KIND

IMPROVED CARPENTERS' TOOLS

Sold by all Hardware Dealers

Stanley Rule and Level Co.

NEW BRITAIN, CONN., U. S. A.

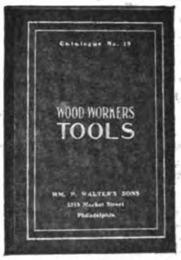
A COMPLETE FRAMING RULE

ON

NICHOLLS FRAMING SQUARE.

On the square is where the carpenter wants his figures, not in a book or on a piece of paper, as they are usually lost.

NICHOLLS MFG. CO.,
OTTUMWA, IOWA.



We have now ready our New Illustrated Catalogue No. 19 devoted exclusively to

Wood Workers' Tools

Containing 250 pages, 1100 illustrations, handsomely printed on good paper, it makes a convenient and valuable book for **all woodworking mechanics.**

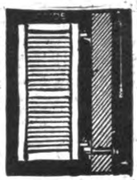
Sent to any address on receipt of 10 cents postage.

WM. P. WALTER'S SONS,
TOOL HEADQUARTERS
1233 Market St., Philadelphia.

Mallory Shutter Worker.

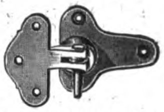
Works and locks the blinds from the inside. Ornamental, durable, perfect working. Applicable to old or new buildings.

Manufactured by
MALLORY MFG. CO.,
Flemington, N. J.



Automatic Blind Hinges

HALE & BENJAMIN'S PATENT



Flush and surface for wood and brick building. Easy to put on, strong and durable. **Warranted.** Also combination awning hinges. With these hinges blinds will not slam or blow off. They are the only hinges adapted to bay or mullion windows, as they require no other fixtures. Testimonials on request from dealers, contractors, and people who have used them several years. We are the sole owners of these two patents. If your dealer does not keep them write to

PARKER WIRE GOODS COMPANY,
Manufacturers,
No. 1 Assonet Street, Worcester, Mass.

Use Our

Folding and Adjustable

Handle Draw Knife!

It is adjustable to any position, adaptable to the awkward places, absolutely rigid when set, handy and compact, a time saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

Write for Prices and Discounts.

A. J. WILKINSON & CO.,
180-188 Washington St., Boston, Mass., U.S.A.

The Rich Handy Drawing Outfit

Saves Time

for the draughtsman, and is a great aid to the learner. It holds a number of sheets or a pad, which requires no fastenings. The Protractor T Square gives accurate angles. You get measurements direct from the board. Has a drawer for instruments, and can be carried around to make drawings on the spot. Circulars free.

J. & G. RICH, 122 N. 6th St., Phila., Pa.

Send for Catalogue No. 62

Giving description of books on Architecture, Building, Engineering and allied subjects. Sample of "Architects & Builders Magazine" sent on request.

Published monthly at $2.00 a year.
Foreign Subscriptions, $3.00 a year.

WM. T. COMSTOCK, Pub., 23 Warren Street, N.Y.

TO LIGHT STORES

Use Frink's sectional glass cluster reflectors. They are made to last and to reflect all the light there is. The most practical fixture made for store lighting.

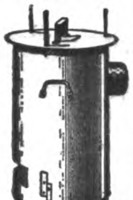
I. P. FRINK, 551 Pearl St., New York.

A 7½ HAND SAW

This is not a PRIZE but a JEWEL. If your dealer can not furnish you one of our CELEBRATED NARROW A 7½ HAND SAW, 6 inch at butt, 1½ inch at point, 4 gauges thin on back, send us P. O. Order for $2.00 and we will send, express prepaid, 26 inch SAW.

C. E. JENNINGS & CO.,
42 Murray Street. NEW YORK.
SOLE MANUFACTURERS.

DRYING STOVES



2 Sizes
Send for Price

THE S. M. HOWES CO.
40-46 Union Street, BOSTON

STANDARD FOR 30 YEARS

This name stamped on every three feet is a guarantee that you are getting the best sash cord that can be made.

SILVER LAKE CO.,
Boston, Mass

FREE 600 PAGE CATALOG

Over 20,000 labor saving, money saving articles for the shop, home or farm, fully illustrated, described and priced in our NEW 600 PAGE CATALOGUE No. 90. Also a larger variety of MECHANICS' TOOLS of all kinds at LOWER PRICES than heretofore shown in any catalogue ever published.

WHY NOT BUY AT WHOLESALE PRICES?

No mechanic should be without this valuable book. If you have not received our catalogue, write us to-day and it will be sent you FREE OF CHARGE.

Send for our new PREMIUM LIST, containing 100 useful and valuable articles given away. Most wonderful offer ever made. SEND FOR IT TO-DAY.

FREIGHT RATES ARE LOWER FROM NEW YORK THAN ELSEWHERE. BUY IN NEW YORK

White, Van Glahn & Co.

Dealers in Reliable Merchandise Since 1816.
14 Chatham Square, New York City

OLDEST MAIL ORDER HOUSE IN AMERICA

Hints Free

URBANA, N. Y., July 10, '06.

TAINTOR MANUFACTURING CO.,

Gentlemen:

I am getting to be an old man and have used all kinds of Saw Sets in the last 30 years, and I can't recommend Taintor's too strongly. I regard it to day the best tool on the market. I wish every carpenter in the country had a copy of your *Hints on the Care of Saws* and one of your Positive Sets. There can be no better made.

Very truly yours.
(Signed) JOSEPH STRONG.

P. S.—I will recommend it to any mechanic.

Taintor Saw Set sold by the trade.
For a copy of HINTS write to

TAINTOR MFG. CO.,
113 Chambers St., New York.

MONARCH Sash Chain

IS THE BEST.
Samples free. Mention this paper.
The Bridgeport Chain Co.
Bridgeport, Conn.

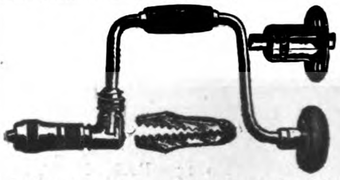
SAMSON SPOT CORD

Distinguished by our trade-mark, the Colored Spot.
Outwears any other device for hanging windows.
SAMSON CORDAGE WORKS, Boston, Mass.

Ask for MILLERS FALLS CO.'S BIT BRACES

Series Nos.	30	31	32	33
	14	12	10	8 inch sweep.

There are no other braces made which match them in merit and beauty of finish.



Our name appears on all genuine goods. Look for it before you buy. If your dealer does not keep Millers Falls Braces then write to us.

Millers Falls Company
28 Warren Street, New York, N. Y.

BARGAINS

We have made by mistake three sizes of short Auger Bits, which we offer at much less than cost. These have the patented concave twist and are high grade tools in every respect. The entire length is 6½", length of twist 3". Will send you one or more, postage prepaid:—6-16", twelve cents in stamps; 7 16", fourteen cents; 9-16" sixteen cents.

FORD AUGER BIT CO.
Holyoke, Mass.

BURLINGTON VENETIAN BLIND CO.
MAKERS OF
BLINDS
AND SCREENS
BURLINGTON, VT.

L. S. Starrett says:

"If you find any tools better than STARRETT TOOLS—buy them."

Send for free Catalogue No. 17 P of the largest line of fine tools made.

The L. S. Starrett Company,
Athol, Mass., U. S. A.

Carpentry and Building

WITH WHICH IS INCORPORATED

The Builders' Exchange

VOL. XXVIII. No. 9. NEW YORK, SEPTEMBER, 1906. Ten Cents a Copy. One Dollar a Year.

Alphabetical List of Advertisers.

American Column Co.	58
American Rolling Mill Co.	11
American Wood Working Machinery Co.	6
Asphalt Ready Roofing Co.	1
Baker McMillen Co.	64
Barnes, W. F. & John Co.	4
Barnes Tool Co.	11
Barnett, G. & H., Co.	1
Batavia Clamp Co.	62
Berger Mfg. Co.	11
Bommer Bros.	1
Boston Bolt Co.	11
Bostrom-Brady Mfg. Co.	65
Boynton Furnace Co.	18
Bradt Pub. Co.	11
Bridgeport Chain Co.	68
Broad Gauge Iron Stall Wks.	59
Burlington Venetian Blind Co.	68
Burritt, A. W. Co.	58
Burt Mfg. Co.	16
C. A. Mfg. Co.	16
Cabot, Samuel	1
Caldwell Mfg. Co.	60
Canton Mfg. Co.	8
Canton Steel Roofing Co.	15
Cement Machinery Co.	9
Chattanooga Roofing & Fdy. Co.	51
Chicago Machinery Exchange	6
Chicago Metal Covering Co.	59
Cincinnati Tool Co.	64
Cleveland Stone Co.	60
Columbia Mineral Wool Co.	18
Comstock, Wm. T.	68
Cordesman, Meyer & Co.	8
Cordesman-Rechtin Co.	7
Cortright Metal Rfg. Co.	13
Crescent Machine Co.	7
Danforth, A. H.	6
Davis & Cook	65
Diamond Expansion Bolt Co	11
Dieckman, F.	15
Disston, Henry & Sons	66
Dixon, Jos., Crucible Co.	67
Drouve, G. Co.	15
Eastern Granite Roofing Co.	14
Eaton & Prince Co.	51
Edwards Mfg. Co.	13
Eller Mfg. Co.	14
Energy Elevator Co.	17
Fay, J. A. & Egan Co.	5
Floyd, Wells Co.	62
Ford Auger Bit Co.	68
Forest City Bit & Tool Co.	62
Foster Munger Co.	59
Fox Machine Co.	8
Fox, P. L.	64
French, Samuel H. & Co.	16
Frink, I. P.	68
Gage Tool Co.	18
Globe Ventilator Co.	16
Goodell Mfg. Co.	61
Grand Rapids Hdw. Co.	8
Grand Rapids Wood Carving Co.	60
Hamlin, George R.	11
Hammacher, Schlemmer & Co.	63
Hartmann Bros. Mfg. Co.	60
Hess Warming & Ventilating Co.	62
Hitchings Co.	51
Howes, S. M., Co.	68
Hurley Machine Co.	3
Ideal Concrete Machinery Co.	9
Interior Hardwood Co.	1
International Cor. Schools	7
International Heater Co.	62
Ives, Hobart B. & Co.	61
Jennings, C. E. Co.	68
Johnson, E. J., Co	14
Kanneberg Rfg. & Ceil. Co.	16
Karol, B. C.	8
Kees, F. D. Mfg. Co.	61
Keighley, S. Metal Ceiling & Mfg. Co.	16
Kidder, R. E.	15
Kimball Bros. Co.	17
King Mfg. Co.	60
Kinnear & Gager Co.	11
Lane Bros. Co.	60
Leavitt Machine Co.	65
Lestershire Lumber & Box Co	16
Long Island Machinery Co.	5
Lord & Burnham Co.	51
Mallory Mfg. Co.	67
Marston, J. M. & Co.	5
Mesker & Bro.	15
Meyers, F. J. Mfg. Co.	17
Miller, A. W., Mfg. Co.	64
Millers Falls Co.	68
Montross Metal Shingle Co.	14
Morse, Williams & Co.	17
Morton, Thomas	62
Mullins, W. H. Co	13
National Mfg. Co.	60
National Roofing Co.	8
National Saw Co.	66
Nat'l Sheet Metal Rfg. Co.	16
New Jersey Zinc Co.	14
N. Y. Steel Corner Plate Co.	16
N. Y. Telephone Co.	15
Nicholls Mfg. Co.	64&67
North Bros. Mfg. Co.	67
O. K. Harry Steel Wks.	5
Ostendorf, W. H.	60
Ostrander, W. R. & Co.	67
Parker Wire Goods Co.	67
Parks Ball Bearing Machinery Co.	5
Pettyjohn Co.	9
Phila. & Boston Face Brick Co.	18
Pike Mfg. Co.	1
Progressive Mfg. Co.	68
Reed & Auerbacher Co.	18
Rehm Hardware Co.	61
Rich, J. & G.	67
Richards Mfg. Co.	61
Sackmann, F. A.	5
Samson Cordage Works	68
Schaller-Hoerr Co.	59
Sedgwick Mch. Works	17
Seneca Falls Mfg. Co.	4
Shimer, Samuel J. & Sons	7
Silver Lake Co.	68
Simonds Mfg. Co.	18
Smith, Otis A.	67
Smith & Egge Mfg. Co.	64
Standard Paint Co.	12
Stanley Rule & Level Co.	67
Stanley Works	1
Star Encaustic Tile Co.	18
Starrett, L. S. Co.	1&68
Stowell Mfg. Co.	12
Strelinger, C. A. Co.	66
Taintor Mfg. Co.	68
Topp, G. A. & Co.	12
Tower & Lyon Co.	63
Tubular Heating & Ventilating Co	62
Union Mfg. Co.	65
U. S. Mineral Wool Co.	18
Van Dorn Iron Wks. Co.	5
Waddell Mfg. Co.	59
Walters, Wm. P. Sons	67
Warner Elevator Mfg. Co.	17
Washburne, E. G. & Co.	11
Wheeling Corrugating Co.	12
White, Van Glahn & Co.	68
Wilkinson, A. J. & Co.	67
Willis Mfg. Co.	18
Wood-Mosaic Flooring Co.	18
Yale & Towne Mfg. Co.	61

Classified List of Advertisers.

Annunciators
Ostrander, W. R. & Co.

Architects' Blue Prints

Architects' Details
Lestershire Lumber & Box Co.

Asbestos
Stowell Mfg. Co.

Auger Bits
Ford Auger Bit Co.
Jennings, C. E. Co.

Awnings
Chattanooga Roofing & Fdry. Co.
O. K. Harry Steel Works

Band Saws
American Wood Working Machinery Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Crescent Machine Co.
Fay, J. A. & Egan Co.

Barrel Swings
Leavitt Machine Co.

Blackboards, Slate
Johnson, E. J. Co.

Blinds
Burlington Venetian Blind Co.
Foster-Munger Co.
Schaller-Hoerr Co.

Blind Hinges
Parker Wire Goods Co.
Stanley Works

Bolts and Nuts
Boston Bolt Co.

Books
Arthur, Wm.
Bradt Pub. Co.
Comstock, Wm. T.
Williams, David, Co.

Boring Machines
Fox Machine Co.
Millers Falls Co.

Brackets, Building, Folding
Danforth, A. H.

Brick Machinery
Cement Machinery Co.

Builders' Hardware
Boston Bolt Co.
Hammacher, Schlemmer & Co.
Rehm Hardware Co.
Yale & Towne Mfg. Co.

Building Brackets, Folding
Danforth, A. H.
Stanley Works
Tower & Lyon Co.

Building Material
Lestershire Lumber & Box Co.

Building Paper and Felt
Cabot, Samuel.
Standard Paint Co.

Builders' Supplies
Schaller-Hoerr Co.

Butts and Hinges
Stanley Works.

Capitals
Grand Rapids Wood Carving Co.
Waddell Mfg. Co.

Ceiling, Metallic
Berger Mfg. Co.
Canton Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Keighley, S. Metal Ceiling & Mfg. Co.
Kinnear & Gager Co.
Wheeling Corrugating Co.
Willis Mfg. Co.

Cement
French, S. H. & Co.

Cisterns, Steel
O. K. Harry Steel Works.

Clamps
Batavia Clamp Co.
Cincinnati Tool Co.

Concrete Block Machines
Cement Machinery Co.
Ideal Concrete Machinery Co.
Pettyjohn Co.

Conductor Pipe and Elbows
Canton Mfg. Co.
Dieckmann, F.

Conductor Pipes
American Rolling Mill.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.

Conductor Shoes
Dieckmann, F.

Conservatories
Lord & Burnham Co.

Contractors' Supplies
Boston Bolt Co.

Cornices, Sheet Metal
Berger Mfg. Co.
Canton Mfg. Co.
Chattanooga Roofing & Foundry Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mesker & Bro.
Mullins, W. H. Co.
Willis Mfg. Co.

Coverings, Metal
Chicago Metal Covering Co.

Cresting
Van Dorn Iron Works Co.
Willis Mfg. Co.

Cutter Heads
Shimer, Sam'l J. & Sons.

Designs and Details
(See House Plans)

Door Checks and Springs
Hammacher, Schlemmer & Co.

Door Checks, Screen
Caldwell Mfg. Co.

Door Hangers
Lane Bros. Co.
National Mfg. Co.

Draw Knives
Wilkinson, A. J. & Co.

Drawing Instruction
International Correspondence Schools.

Drawing Outfits
Comstock, Wm. T.
Rich, J. & G.

Drying Stoves
Drouve, G. Co.
Howes, S. M. Co.

Dumb Waiter Fixtures
Hammacher, Schlemmer & Co.

Eave Troughs
Chattanooga Roofing & Fdry. Co.
Eller Mfg. Co.
Wheeling Corrugating Co.

Elevators and Dumb Waiters
Eaton & Prince Co.
Energy Elevator Co.
Kimball Bros. Co.
Meyers, F. J. Mfg. Co.
Morse, Williams & Co.
Sedgwick Machine Works.
Warner Elevator Mfg. Co.

Etching Fluid
Reed & Auerbacher Co.

Exhaust Heads
Burt Mfg. Co.

Expansion Bolts
Boston Bolt Co.
Diamond Expansion Bolt Co.

Fencing
O. K. Harry Steel Works.

Files and Rasps
Barnet, G. & H. Co.
Boston Bolt Co:

Floor Scrapers
Hurley Machine Co.

Framing Tools
Topp, G. A., & Co.

Furnaces and Heaters
Boynton Furnace Co.
Floyd-Wells Co.
Hess Warming & Ventilating Co.
International Heater Co.
Tubular Heating & Ventilating Co.

Gas and Electric Fixtures
Frink, I. P.

Grates, Fancy Plated
Chattanooga Roofing & Fdry. Co.

Greenhouses
Hitchings & Co.
Lord & Burnham Co.

Grille Work, Wood
Foster-Munger Co.
Waddell Mfg. Co.

Grindstones
Cleveland Stone Co.
Richards Mfg. Co.

Grooving Heads
Fox Machine Co.

Hangers, Barn Door
Richards Mfg. Co.

Hangers, House Door
Richards Mfg. Co.

Hardware Jobbers
White, Van Glahn & Co.

Hardware Specialties
Richards Mfg. Co.

Heaters.—*Steam and Hot Water.*
International Heater Co.
Lord & Burnham Co.

Hinges, Spring
Bommer Bros.

Hinges, Window Screen
Kees, F. D. Mfg. Co.

House Plans
Comstock, Wm. T.

Iron House Fronts
Mesker & Bro.

Iron Work
Van Dorn Iron Works Co.

Lath, Metal
Wheeling Corrugating Co.

Levels
Baker, McMillen Co.
Bostrom-Brady Mfg. Co.
Davis & Cook.

Lightning Rods
Washburn, E. G. & Co.

Locks
Rehm Hardware Co.
Yale & Towne Mfg. Co.

Lumber and Shingles
Lestershire Lumber & Box Co.

Mangers, Slow Feed
Broad Gauge Iron Stall Works.

Mantels
Burritt, A. W., Co.
Foster-Munger Co.
French, Sam'l H. & Co.
Ostendorf, W. H.
Phila. & Boston Face Brick Co.

Masons' Stoves
Drouve, G. Co.

Metal Covering
Chicago Metal Covering Co.

Mill Work
Schaller-Hoerr Co.

Mineral Wool
Columbia Mineral Wool Co.
U. S. Mineral Wool Co.

Miter Boxes
Goodell Mfg. Co.
Nicholls Mfg. Co.

Miter Machines
Fox Machine Co.

Miters
Fox, P. L.

Moldings
American Column Co.
Grand Rapids Wood Carving Co.
Schaller-Hoerr Co.
Waddell Mfg. Co.

Moldings, Wood, Metal Covered
Chicago Metal Covering Co.

Mortar Colors
French, Sam'l H. & Co.

Mortisers, Hand
Miller, Albert W., Mfg. Co.

Oil Filters
Burt Mfg. Co.

Ornamental Sheet Metal Work
Mullins, W. H. Co.

Ornamental Wire, Iron, Steel and Brass Work
Meyers, F. J. Mfg. Co.

Paint
New Jersey Zinc Co.
Standard Paint Co.

Parquette Flooring
Interior Hardwood Co.
Wood-Mosaic Flooring Co.

Patent Lawyers
Hamlin, George R.

Pencils
Dixon, Jos. Crucible Co.

Planes
Gage Tool Co.
Smith, Otis A.
Tower & Lyon Co.
Union Mfg. Co.

Plasterers' Corner Plates
New York Steel Corner Plate. Co.

Plastic Ornaments
French, Samuel H. & Co.

Plumbers' Supplies
Karol, B. C.

Porch Columns
American Column Co.
Hartman Bros. Mfg. Co.

Post and Mining Machinery
Cement Machinery Co.

Reflectors
Frink, I. P.

Roofing, Art Metal Tile
Mullins, W. H. Co.

Roofing and Siding
Asphalt Ready Roofing Co.
Berger Mfg. Co.
Canton Mfg. Co.
Canton Steel Roofing Co.
Drouve, G. Co.
Eastern Granite Roofing Co.
Edwards Mfg. Co.
Eller Mfg. Co
Kanneberg Roofing & Ceiling Co.
Lincoln Waterproof Cloth Co.
National Roofing Co.
O. K. Harry Steel Works.
Standard Paint Co.
Stowell Mfg. Co.
Wheeling Corrugating Co.

Roofing Brackets
Stanley Rule & Level Co.

Roofing Paint
Asphalt Ready Roofing Co.
Dixon, Jos. Crucible Co.

Roofing Slate
Johnson, E. J. Co.

Sash Balances
Caldwell Mfg. Co.

Sash Chains
Bridgeport Chain Co.
Morton, Thomas.
Smith & Egge Mfg. Co.

Sash Cord
Samson Cordage Works.
Silver Lake Co.

Sash Locks
Ives, H. B. & Co.

Sash Operating Devices
Hitchings & Co.
Lord & Burnham Co.

Sash Pulleys
Grand Rapids Hardware Co.

Sashes, Doors and Blinds
Foster-Munger Co.
Lestershire Lumber & Box Co.

Saw Clamps
Disston, Henry & Sons.

Saw Filing Guide
Disston, Henry & Sons.

Saw Jointers
Crescent Machine Co.

Saw Sets
Taintor Mfg. Co.

Saw Tables
Chicago Machinery Exchange.
Crescent Machine Co.
Kidder, R. E.

Saws
Disston, Henry & Sons.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
National Saw Co.
Simonds Mfg. Co.

Schools
International Correspondence Schools.

Screw Drivers
North Bros. Mfg. Co.

Sheet Metal Fronts
Mesker & Bro.

Shingles and Tiles, Metallic
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Cortright Metal Roofing Co.
Montross Metal Shingle Co.
National Sheet Metal Roofing Co.
Willis Mfg. Co.

Shingles Hip
Wheeling Corrugating Co.

Shingle Stains
Cabot, Samuel.

Shutter Worker
Mallory Mfg. Co.

Shutters (See Blinds)

Skylights
Canton Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Drouve, G. Co.
Edwards Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mullins, W. H. Co.
Willis Mfg. Co.

Speaking Tubes
Ostrander, W. R. & Co.

Spring Hinges
Bommer Bros.

Squares
Fox, P. L.
Nicholls Mfg. Co.

Steel Figures and Letters
Sackman, F. A.

Stoves and Ranges
Boynton Furnace Co.

Structural Iron and Steel Works
Boston Bolt Co.

Structural Slate
Johnson, E. J. Co.

Tanks, Steel
O. K. Harry Steel Works

Telephones
New York Telephone Co.

Tiling
Ostendorf, W. H.
Star Encaustic Tile Co.

Tool Boxes
Walter's Sons, W. P.

Tool Cabinets
Hammacher, Schlemmer & Co

Tool Chests
Jennings, C. E. Co.

Tools
Forest City Bit & Tool Co.
Gage Tool Co.
Hammacher, Schlemmer & Co
Jennings, C. E. Co.
Millers Falls Co.
North Bros. Mfg. Co.
Progressive Mfg. Co.
Reed & Auerbacher Co.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S., Co.
Strelinger, C. A., Co.
Tower & Lyon Co.
Walter's Sons, Wm. P.
Wilkinson, A. J., & Co.

Turned, Molded Carved Work
Waddell Mfg. Co.

Ventilating Attachment
Drouve, G., Co.

Ventilators
Burt Mfg. Co.
Globe Ventilator Co.

Veranda Stock
American Column Co.

Vises
Hammacher, Schlemmer & Co

Wagon Jacks
Batavia Clamp Co.

Wall Ties, Wire
C. A. Mfg. Co.

Weather Strips
Hammacher, Schlemmer & Co
King Mfg. Co.

Weather Vanes
Broad Gauge Iron Stall Works.

Window Apparatus
Drouve, G. Co.

Window and Door Stops
King Mfg. Co.

Window Fasteners
Stanley Works.

Window Stop Adjusters
Ives, Hobart B., & Co.

Window Trimmings
Caldwell Mfg. Co.

Windows, Fireproof
Mullins, W. H. Co.

Wire Wall Ties
C. A. Mfg. Co.

Wood Carving
Grand Rapids Wood Carving Co.

Wood Mantels
(See Mantels)

Wood Ornaments
Waddell Mfg. Co.

Wood Trimmers
Fox Machine Co.

Wood Working
Lestershire Lumber & Box Co.

Wood Working Machinery
American Wood Working Mach'y Co.
Barnes, W. F. & John.
Barnes Tool Co.
Chicago Machinery Exchange
Cordesman, Meyer & Co.
Cordesman-Rectin Co.
Fay, J. A. & Egan Co.
Fox Machine Co.
Kidder, R. E.
Long Island Machinery Co.
Marston, J. M. & Co.
Parks Ball Bearing Machinery Co.
Seneca Falls Mfg. Co.

Wood Working Machinery, Second Hand
Long Island Machinery Co.

FACTS AND FIGURES

A Simple Problem in Arithmetic

A SOLUTION WHICH IS OF INTEREST TO YOU

The Old Way

One man will scrape, by hand, about two squares, or two hundred square feet of flooring, in eight hours. The wage scale for this is from 40 cents to 55 cents per hour, or from $3.20 to $4.40 for 200 square feet, which is $1.60 to $2.20 per square.

The "Little Giant" Floor Scraper

FOR OAK, MAPLE, BIRCH, BEECH, YELLOW PINE, PARQUET } Floors

Scrapes every inch of floor, into corners and along baseboard

The New Way

One man with a "LITTLE GIANT" FLOOR SCRAPER will scrape eight squares, or 800 square feet of flooring, in eight hours, which at the wage scale of from 40 cents to 55 cents per hour, would be 40 cents to 55 cents per square.

PAYS FOR ITSELF IN A FEW DAYS.

SAVING

A saving is therefore made of from $1.20 to $1.65 per square.

On 5,000 square feet (50 squares), the saving will be from $60.00 to $82.50, which at the lowest wage scale, practically pays for the machine.

We furnish one dozen knives with each machine, and they will scrape 30,000 square feet of flooring.

New knives cost $6.00 per dozen.

SOLD UNDER OUR GUARANTEE TO DO BETTER, FASTER AND CHEAPER WORK THAN ANY OTHER METHOD

Price Complete . . $65.00
F. O. B. Chicago or New York

MANUFACTURED BY THE

HURLEY MACHINE COMPANY

General Offices and Works:
153-159 SOUTH JEFFERSON STREET
CHICAGO, U. S. A.

New York Office: 1010 FLAT IRON BUILDING

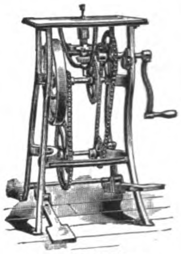

"Victor" Scroll Saw.


"Diamond" Mortiser.

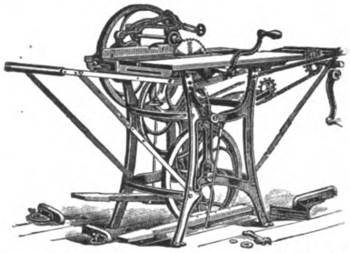
FOOT, HAND AND POWER
WOOD-WORKING MACHINERY

For Carpenters, Builders, Cabinet-Makers and Other Wood-Workers.

Built for Hard Work, Accurate Work and Long Service.


"Rex" Moulder.

ONE MAN with one of these machines will do the work of four to six men using hand tools; will do it easier, will do it better.


No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw.

WE GUARANTEE each machine to be thoroughly practical and accurate. Machines sent on trial, and if not found entirely satisfactory may be returned at our expense.

96


No 8 "Union" Power Saw.

Enterprising mechanics are quick to see the superior merits of our machines. It will pay you to investigate these advantages.

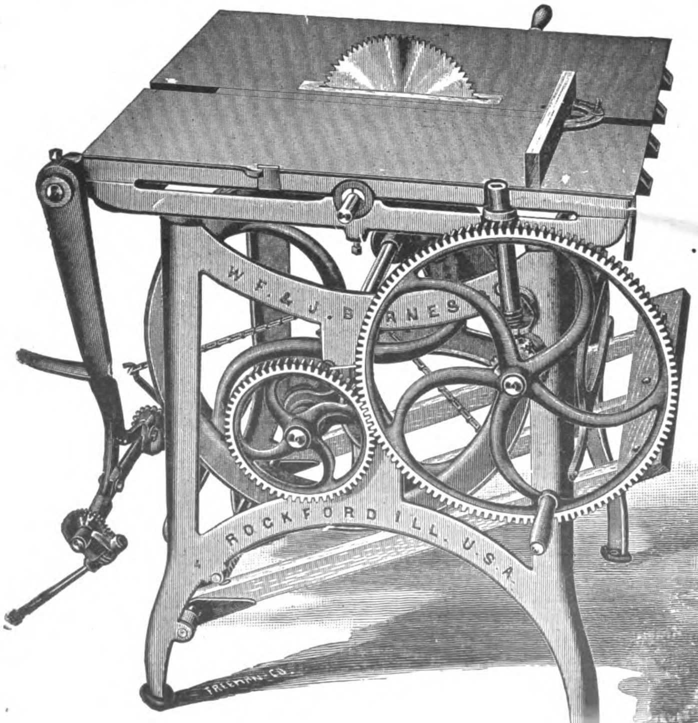
SEND FOR CATALOG "A."

The Seneca Falls Manufacturing Co.

209 Water Street, Seneca Falls, N. Y., U. S. A.


No. 6 "Union" Combination Saw.

Barnes Foot and Hand Power Machinery



For CARPENTERS and BUILDERS.

Our New Hand and Foot Power Circular Saw No. 4, the strongest, most powerful, and in every way the best machine of its kind ever made for ripping, cross cutting and for grooving, gaining, dadoing and rabbeting. Solid iron table planed perfectly true.

We make nine other machines fo Wood Workers.

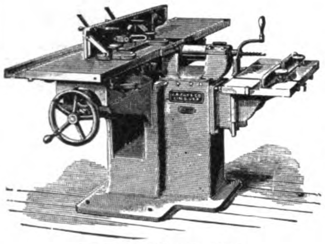
The Only Complete Line of Such Machines made.

Strong,
Practical,
Durable.

Catalogue Free on Application.

W. F. & JOHN BARNES C

71 Ruby St., Rockford, I



Universal Wood Worker

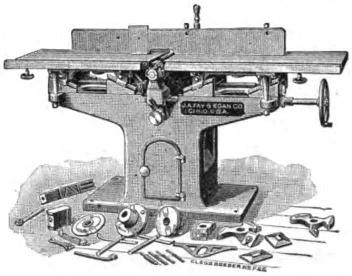
EVERY CARPENTER and **BUILDER** should have this machine because it will do a variety of work quicker and better than it can be done by hand and takes the place of several tools. It planes out of wind, surfaces, rabbets, joints, bevels, gains, champers, plows, makes glue joints, squares up bed posts, table legs, etc., raises panels, rips, cross cuts, tenons, bores, routs, etc., etc.

Ask for circular giving complete details.

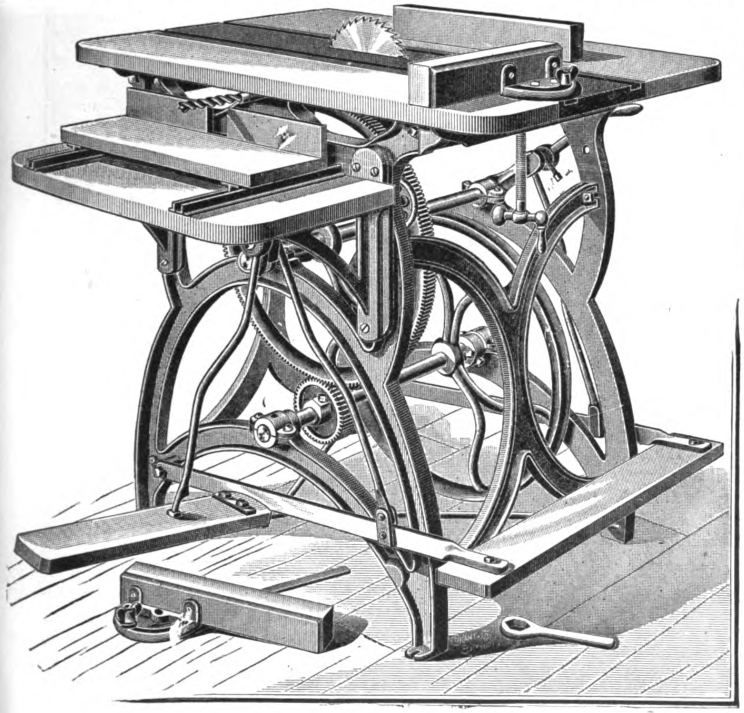
Boring and Routing Side.

Planing and Jointing Side.

221-241 W. Front St.
Cincinnati, Ohio, U.S.A.
J.A. FAY & EGAN CO.
The World's Standard for Woodworking Machinery.



Marston's Hand and Foot Power Circular Saw.



Iron frame, 36 inches high.
Center part of top is made of iron accurately planed, with grooves on each side of saw for gauges to slide in.
Steel shafts and best babbitt metal boxes.
Gears are all machine-cut from solid iron.
Boring table and side treadle.
Two 7-inch saws and two crank handles with each machine.
Weight complete, 350 pounds.
Send for catalogue.

J. M. MARSTON & CO., 201 Ruggles St., Boston, Mass.

VAN DORN IRON WORKS CO
CLEVELAND, OHIO.
STRUCTURAL STEEL & ORNAMENTAL IRON WORK.
JAIL WORK, JOIST HANGERS, IRON FENCINGS.

SECOND-HAND WOOD WORKING MACHINERY

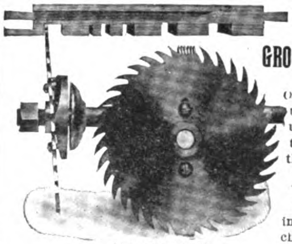
Woods Moulder 12 in. Matchers 24 in.
Berlin Moulder 15 in. Pony Planers 16, 20, 24 in.
Rogers Moulder 8 in.

Variety Machines, Double and Single, Jointers, Swing Saws, Rolling Top Saw Tables, Gas and Gasoline Engines, Band Saws, Routers, Sanders, Circular Saws, Jig Saws.

A1 CONDITION. PROMPT DELIVERY.

All Kinds of Machinery Purchased for Cash.

LONG ISLAND MACHINERY CO.
15 Washington Ave., Brooklyn, N. Y.

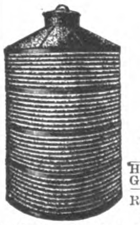


GROOVER

One of the valuable tools that go with Wood-Working Machinery

Manufactured by
Parks Ball Bearing Machine Co.
Sta. A, CINCINNATI, OHIO.

MARK YOUR TOOLS WITH A STEEL STAMP.
OHIO
F. A. SACKMANN.
61 PROSPECT ST.
CLEVELAND, OHIO.
SEND FOR PRICE-LIST No. 7



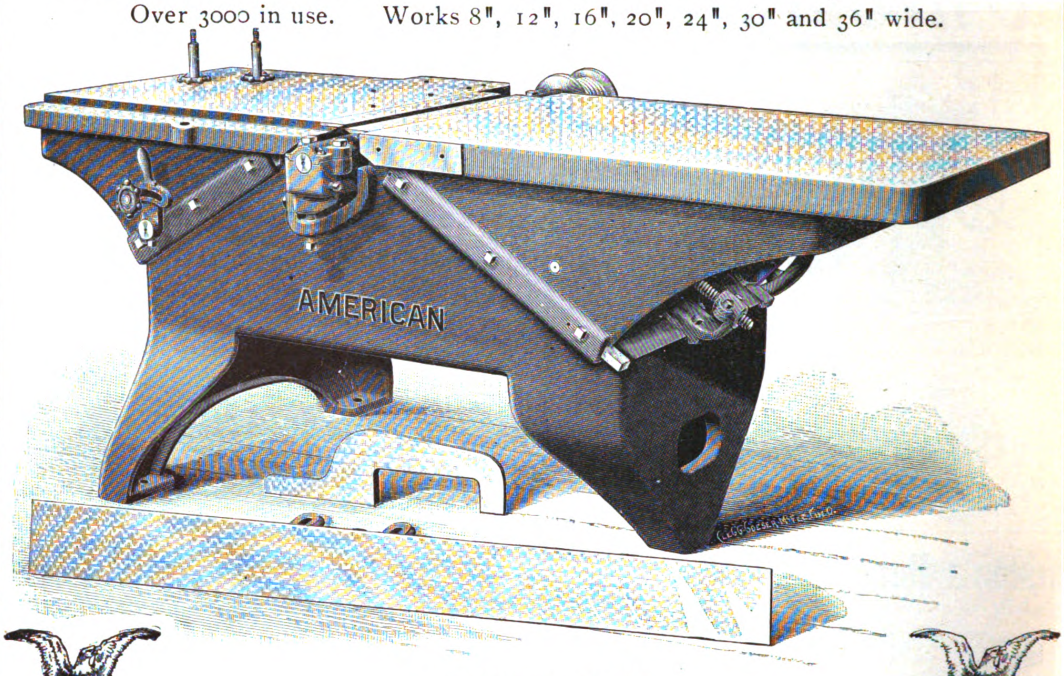
Harry's Patent Adjustable Steel Drop Awnings.

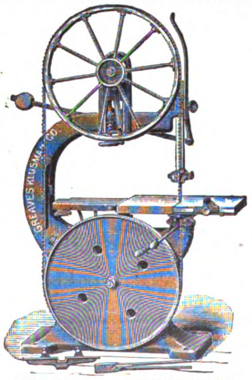
Harry's Underground Corrugated Galvanized Steel Cisterns and Tanks

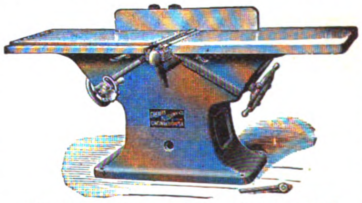
Roofing of all kinds, Fencing, etc.
Send for catalogue, prices, etc.

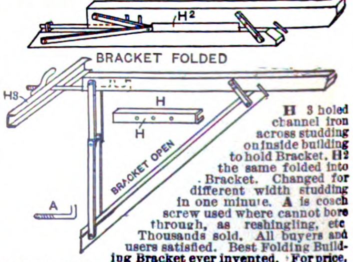
O.K. Harry Steel Works, 2341 Papin St., St. Louis, Mo.

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google


AMERICAN

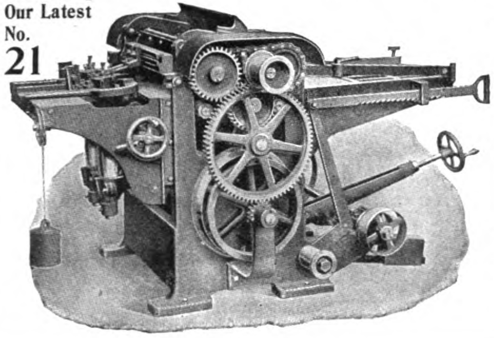

GREAVES KLUSMAN CO.




H²
BRACKET FOLDED
H3
H
H
BRACKET OPEN
A

Solid Facts Concerning Our Latest No. 21

"INNOVATION" PLANER MATCHER and MOULDER



A positive feed medium weight, convenient tool! Insuring a perfectly finished product. Requires little room and power.

Cylinder made of crucible steel, for two belts; all rolls driven; two speeds of feed and a binder to instantly stop and start same.

A SPECIAL FEED MECHANISM MADE OF STEEL FRICTIONLESS ROLLER LINK CHAIN insures DURABILITY and SIMPLICITY, besides ELIMINATING MANY GEARS AND STUDS.

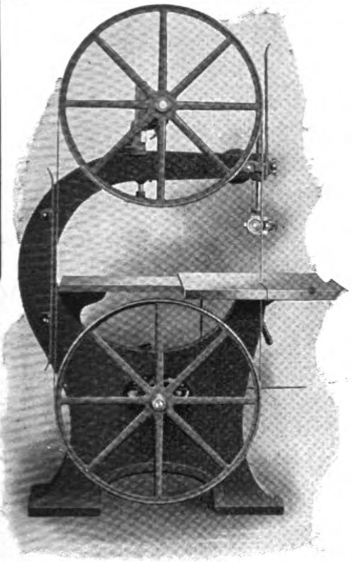
Spring and Crown Moulds can be made in one operation, a feat possible with but few if any similar machines.

Planes up to 26 in. wide and 8 in. thick. Matches up to 14 in. wide and 2 in. thick.

Possesses many other valuable features peculiar to itself. Ask for full particulars.

The Cordesman=Rechtin Company

Dept. "B" Butler St., CINCINNATI, OHIO



The Rigid Construction and Modern Design of the New 36=inch CRESCENT BAND SAW insure a machine of the very highest efficiency as a rapid producer of accurate work.

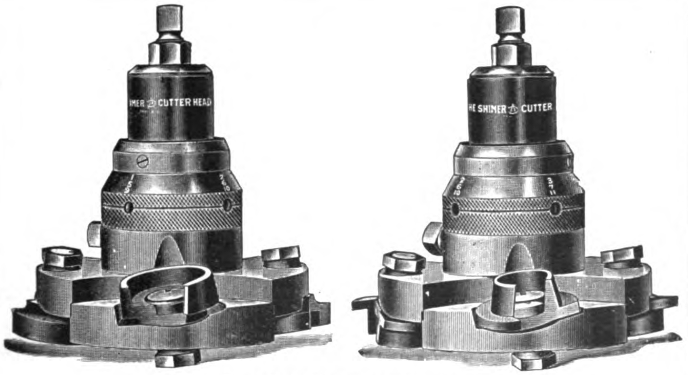
CRESCENT machines cost less than others of equal merit.

They are best because they are strong, durable and practical.

They are low in price because they are in big demand and we have to build them in large quantities.

Send at once for catalogue describing our complete line of BAND SAWS, SAW TABLES and JOINTERS.

THE CRESCENT MACHINE COMPANY, 206 Main Street, Leetonia, Ohio, U.S.A.



Best of All, Fig. 202 and Fig. 203.

The Shimer Cutter Head

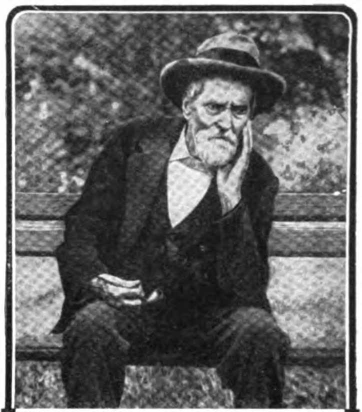
For Flooring, Ceiling, Siding, Ship Lap, Jointing, Double Ceiling, Doors, Sashes, Blinds, Etc. Special Tools for Special Service.

Should appeal to every user of a matching, moulding or tenoning machine because it does more and better work than any others and requires less labor and expense to keep it in order.

We make it of every size and style to fit any machine and send on trial thirty days to responsible lumbermen.

Send for our Catalogue and Pattern Book. It gives illustrations and complete description of a number of these tools, some of which will be of advantage to you.

SAMUEL J. SHIMER & SONS, MILTON, PENNSYLVANIA



He Never Had YOUR Chance

In this man's day there was little chance for the chap who started out in life as a workman with no special education. He was foredoomed to work for small wages until finally disqualified by old age. With **YOU** it is different. If you are not getting ahead as fast as you should in your chosen occupation, the INTERNATIONAL CORRESPONDENCE SCHOOLS will help you.

A record of nearly 15 years of remarkable success in training thousands of ambitious wage earners for better positions and increased earnings enables us to state positively that we can help **YOU** if you really want to get ahead, no matter how scant your time, money, or education may be. It puts you under no obligation whatever to mark and mail the coupon below, asking how we can adapt this plan to your own individual case and circumstances. Don't neglect any possible chances for advancement. **Send in the coupon NOW.**

INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 969, SCRANTON, PA.

Please explain, without further obligation on my part, how I can qualify for a larger salary in the position before which I have marked **X**

Architect
Architectural Drafts.
Building Inspector
Contractor & Builder
Structural Engineer
Mechanical Engineer
Mech. Draftsman
Machine Designer
Electrical Engineer
Municipal Engineer
Heat. and Vent. Eng.
Chemist
Sheet-Metal Drafts.

Sanitary Engineer
Foreman Plumber
Electrician
Steam Engineer
Marine Engineer
Surveyor
Textile Expert
Bookkeeper
Stenographer
Ad Writer
French } With
German } Edison
Spanish } Phon'gr'ph

Name ____________________

St. & No. ____________________

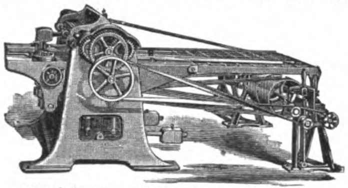
City ____________________ *State* ____________________

CORDESMAN, MEYER & CO., 26, 28 and 30 Central Avenue

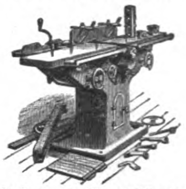
CINCINNATI, OHIO.

Manufacturers of Latest Improved

Wood-Working Machinery

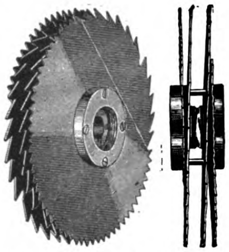


No. 2 Planer, Matcher and Moulder.



Universal Wood-Worker.

FOX



Adjustable Saw Dado Heads

The best thing for cutting grooves.

Fox Foot Power Miter Machines

The best thing for mitering mouldings and similar work.

We also make

Universal Trimmers,
Boring Machines, Lathes,
Planers, etc.

FOX MACHINE CO.

387 N. Front St., Grand Rapids, Mich.

PLUMBERS' SUPPLIES

AT WHOLESALE.

If you need anything in my line, and wish to

SAVE

20 to 40 Per Cent

on every article, write for my free illustrated Catalog. Shipments promptly made from a very complete stock of guaranteed goods.

Small orders are as carefully handled as large ones.

B. C. KAROL, 236 W. Harrison St., Chicago, Ill.

A NEW BOOK

Concrete-Block Manufacture
Processes and Machines

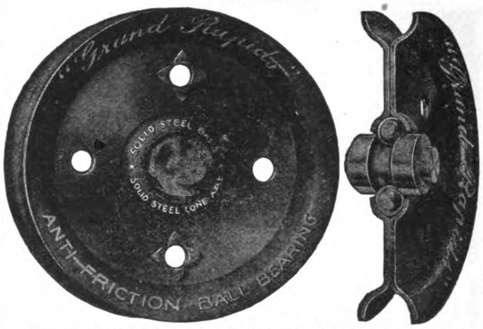
By H. H. RICE

152 Pages 46 Half-tone Cuts
Bound in Cloth
Price $2.00 Postpaid

DAVID WILLIAMS COMPANY

14-16 Park Place - - - - NEW YORK

PATENT PENDING.



"Ball-Bearing" Grand Rapids All-Steel Sash Pulleys

Are sold DIRECT to
BUILDERS,
CONTRACTORS
and MILLS,

At prices under the common ordinary goods.

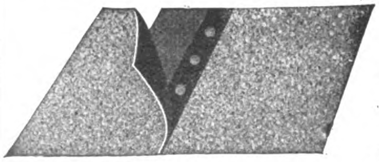
If you make ten or ten thousand window frames, we can save you money and give you a superior sash pulley. We are the largest sash-pulley makers in the world. We ship direct, or through dealers and jobbers everywhere.

Write for catalogue and free samples and prices on half-gross, gross, barrel or any quantity.

Direct from the Makers to you. Inquiries welcome.

GRAND RAPIDS HARDWARE CO.,

PEARL STREET - - - GRAND RAPIDS, MICH.



"Security Roofing"

(Reg. U. S. Patent Office)

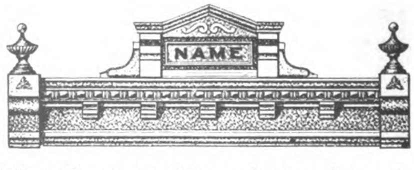
Has a patent six joint with no nails driven through the top sheet.

Made to be laid and then forgotten.

Beware of Infringements.

NATIONAL ROOFING CO., Tonawanda, N. Y.

Cornice, Conductor Pipe, Metal



CEILINGS
HANGERS
EAVE TROUGH
VENTILATORS
SKYLIGHTS

Cat. on Application.

The Canton Manufacturing Co., - Canton, Ohio

Portable Hollow Concrete Block Machine

BEST—FASTEST—SIMPLEST—CHEAPEST.

MOVE THE MACHINE—NOT THE BLOCKS

Saves labor of off-bearing, avoids loss by crackage or breakage, saves expense of heavy cumbersome iron pallets. Sand, Water and Portland Cement only materials required. BIG PROFITS. Blocks cost 6 cents to make. Sell for 18 cents. Whole outfit costs $125.00.

FULLY GUARANTEED. SENT ON TRIAL.

THE PETTYJOHN CO., 616 North 6th Street,
TERRE HAUTE, IND.

BOOKS ON THE DESIGN AND INSTALLATION OF HEATING SYSTEMS

Questions and Answers on the Theory and Practice of Steam and Hot Water Heating

By R. M. STARBUCK. 100 Pages. Pocket size. Illustrated. Cloth, $1.00.

Of great value to Fitters, as well as to those who are beginning the study of heating science.

Furnace Heating

By WILLIAM G. SNOW. 170 Pages. 90 Illustrations. Size, 6 x 9. Cloth, $1.50.

A complete guide to the furnaceman, builder and owner on designing and laying out furnace work for dwellings, and for schools, public buildings, churches, &c.

Modern Sanitary Plumbing, Steam and Hot Water Heating

By JAMES J. LAWLER. 400 Pages. 288 Illustrations. Size, 6 x 9. $5.00.

This book, the latest and best of Mr. Lawler's writings, is suited to the requirements of all who seek plain directions on the construction of steam and hot water plants and plumbing work. The numerous illustrations and large folding plates are a feature.

Baldwin on Heating; or, Hints to Steam Fitters

By WILLIAM J. BALDWIN. 348 Pages. 125 Figures, 6 Plates. Size, 5 x 7½. Cloth, $2.50.

Treats at length on heating by steam, giving descriptions of steam heating apparatus for warming and ventilating both private houses and large buildings.

American Steam and Hot Water Heating Practice

317 Pages. Size, 8½ x 11. Cloth, $3.00.

Largely given to descriptions and diagrams for heating systems, which have been successfully installed in important buildings, such as apartment houses, churches, schools, theatres and amusement halls, public buildings, hospitals, hotels and office buildings.

Heating and Ventilating Buildings

By R. C. CARPENTER. Fourth Edition, largely rewritten. 562 Pages. 277 Figures. Size, 6 x 9. Cloth, $4.00.

A leading work, giving directions for the construction and methods of designing; installing and estimating costs of apparatus for all heating systems now in use.

Steam Heating and Ventilation

By WILLIAM S. MONROE. 150 Pages. 89 Illustrations. Cloth, $2.00.

Here, in a very condensed form, is given all the data needed in laying out steam heating and ventilating work.

Steam and Hot Water Fitters' Text-Book

By THOMAS E. McNEILL. 140 Pages. Numerous illustrations and diagrams. Size 5 x 7. Cloth, $1.00.

Given to the first principles of steam and hot water heating and fitting treating mainly in the form of questions and comprehensive answers on the different heating appliances and apparatus, what they are, how they are installed and connected.

Dean's System of Greenhouse Heating

By MARK DEAN. 146 Pages. Illustrated. Size, 5½ x 7¾. Cloth, $2.00.

Valuable for reference both in relation to greenhouse heating and general work.

Notes on Heating and Ventilation

By JOHN R. ALLEN. 152 Pages. 34 Illustrations. Size, 4½x6½. Cloth, $2.00.

One of the newest books for the steam fitter and designer of heating systems. To those who have some knowledge of the construction and operation of heating systems it will be one of the most helpful references.

Formulas and Tables for Heating

By J. H. KINEALY. 53 Pages. Size 4½ x 7. (Pocket size.) Leather, $1.00.

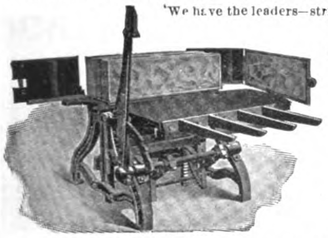
Gives in a practical form the methods used by the best German Engineers who have accomplished surprising results in formulating data and rules in the design of heating and ventilating plants. Shows how to determine the heat lost through the various kinds of walls, all the way from a single board wall to elaborate corrugated iron and concrete floors.

POST OR EXPRESSAGE PAID.

DAVID WILLIAMS COMPANY, 14-16 Park Place, New York

CONCRETE BLOCK, BRICK, POST and MIXING MACHINERY

"We have the leaders—strictly high grade



NORMANDIN
BLOCK
MACHINES

HIGHEST
AWARDS

FAVORITE
CONCRETE
BRICK
MACHINES

CEMENT MACHINERY CO., Hall Bldg., **Jackson, Mich.**

HOW TO MIX PAINTS

¶ A simple treatise suited to the requirements of carpenters, builders and others, who have not had the benefit of long training and experience in the mixing of colors. It will assist the reader to match any given color. Fifty Cents, Postpaid

David Williams Company
14-16 Park Place - - NEW YORK

WANTED
PORTABLE SCHOOL HOUSES

The Department of Education, Porto Rico, solicits correspondence with firms equipped to manufacture portable school buildings, uniform design, either from their own plans or from plans furnished by the Department. Approximate dimensions, 20 by 27 feet; approximate floor space, 550 square feet; height to plates about 10 feet, roof not less than ⅓ pitch. Firms having stock sizes, or desiring to construct from their own plans, will state dimensions they propose to use for building and timbers; kind and quality of materials: size and approximate weight of largest sections; and prices in lots of 5, 10 and 20 buildings, KN, f.o.b. steamer, Brooklyn, N.Y. For further particulars address

COMMISSIONER OF EDUCATION
SAN JUAN, P.R.

A New and Convenient Reference for the Builder and Contractor.

The Estimator's Price Book and Pocket Companion

By I. P. HICKS

This book is gotten up to bring within a small and convenient compass the prices of all descriptions of building material, thus saving the estimator much of the time and trouble involved in consulting trade catalogues.

Not only are the average market figures of all material required in the construction of ordinary buildings presented, but the entire matter is interspersed with useful information, with data on measurements and on quantities of materials required and with labor saving tables, making the book one of exceptional usefulness.

* * *

In order that this handbook may be easily adapted to conform with the variations in figures prevailing in different localities, blank spaces are provided throughout for appending memoranda of local prices, or those which meet the requirements of special work.

A numerous collection of handy tables is a useful feature. These include lumber measure, complete rafter tables for any width and pitch of roof, sizes and weights of iron columns and I-beams required to carry certain loads, safe bearing loads of timber, and of structural iron, &c.

* * *

Mr. Hicks also presents along with other points on estimating, a practical short-cut method which he considers to be the best yet devised.

172 pages. Handy Pocket Size. Cloth bound.
Price $1.00 Postpaid.

Published by
DAVID WILLIAMS COMPANY
14-16 PARK PLACE NEW YORK

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

"AMERICAN"
Polygon Conductor Pipe

**Can be furnished in either Galvanized Iron or Copper.
It is made from galvanized iron in 10-ft. lengths,
without a cross seam; from copper in 8-ft. lengths.**

American Rolling Mill Co., MIDDLETOWN, OHIO.

ARCHITECTS! CONTRACTORS! BUILDERS!

When you want any STRUCTURAL WORK it will pay you to write to the

BOSTON BOLT COMPANY
ESTABLISHED 1872

**Works, Offices and Salesroom
38-54 Farnsworth Street**

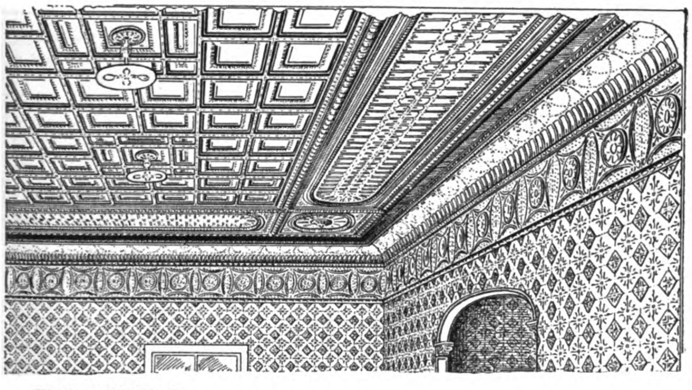
Convertors of Iron and Steel into Bolts, Expansion Bolts, Nuts, and all kinds of Structural Work for Mills, Churches, Halls, Factories, Bridges, Wharves, Etc., and Iron Work of all kinds forged and made to order. *Send for catalog.*

JOHN W. CROOKS, Treasurer
BOSTON, MASS.

To Make Money From Your Invention

it must be protected by such a PATENT as will enable you to completely MONOPOLIZE it and control infringers. I procure patents that stand the test of competition at a cost probably nowhere near as high as you may think. The patent law favors the DILIGENT, not the indolent, inventor, so send me TO-DAY a sketch or model, and explanation of your invention and I will furnish full advice. To morrow, next week, or next month may be too late. References on request.

GEO. R. HAMLIN, Patent Lawyer, 800 H Street, N. W., Washington, D. C.



THE KINNEAR
LOCK-JOINT STEEL CEILING, Etc.

Has no equal. Try it and be convinced. Prices reasonable.
Catalog upon request. Send measurements for estimate.

The Kinnear & Gager Co., M'f'r's, COLUMBUS, OHIO
BOSTON, 125 Broad St.

We make Ceilings for churches, schools, stores, lodge rooms, court rooms, libraries, residences, etc.

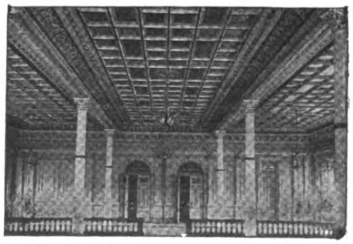
Our ceilings are shipped ready for erection. No expert labor required. Working drawings furnished. They're adapted to any kind of building. Exclusive in classified design.

Berger "CLASSIK"
Steel Ceilings

We also make Steel Roofing, Siding, Metal Shingles, Architectural Sheet Metal Work and Fireproofing Material.

Our catalogues sent you free. Ask for them.

THE BERGER MFG. CO.
CANTON, OHIO.
New York. Boston. Phila. St. Louis



COPPER
LIGHTNING RODS

ABSOLUTE PROTECTION from LIGHTNING is given by use of our continuous copper conductors.
E. G. Washburne & Co., 46 Cortlandt St., New York.
Telephone 3125 Cortlandt.
Work put up or material furnished.

THE IMPROVED
Hand and Foot Power E. F. B.
SAWING MACHINE.

For Carpenters, Builders and All Wood Workers Who Have Shops Without Power.
SEND FOR CIRCULAR.
THE BARNES TOOL CO., New Haven Conn.

Diamond Expansion Bolt.

Patented.
For fastening fixtures, timbers, etc., to brick, ston oncrete or other masonry.
DIAMONDEXPANSION BOLT CO.,
9-11-13-15 Murray Street, New York, N. Y

Estimating!

Estimating the cost of a job safely and correctly is the most vital element of success to the contractor. Therefore he should have a copy of ***The Lightning Estimator*** for residence work, etc. Illustrated. Covers the entire field for the mason and carpenter, teaching a new practical, reliable method, showing the exact cost of each separate item of the labor and material, but so arranged that a medium priced house may be estimated in 30 to 60 minutes. For the busy builder. Is having the most phenomenal sale and splendid endorsement of any book of its kind ever put upon the market. In a class by itself. Prepared by a builder of experience from actual building construction, not theory. Large sales permit us to sell the book for 60 cents. (Money order.) You cannot afford to wait. Write now.

BRADT PUB. CO.,
260 Michigan Avenue, JACKSON, MICH.

VIRGINIA METAL SHINGLE ROOFING

FIRE PROOF—WEATHER PROOF—ORNAMENTAL

Made of Terne Plate Painted or Terne Plate
Galvanized After Forming

MADE ONLY BY

WHEELING CORRUGATING CO., WHEELING, W. VA.

BRANCH OFFICES AND WAREHOUSES:

New York City, 47-51 Cliff Street
Chicago. 23, 25, 27 N. Clinton Street
St. Louis, 112, 114, 116 So. Eighth Street
Philadelphia, 402, 404, 406 Race Street
Boston, Mass., 132 and 134 Pearl Street
Chattanooga, Tennessee

Not Expensive

Write For Prices

Any Handy Mechanic
Can Apply Our Metal Shingles

DIXIE, STELLA AND VIRGINIA
ALL HAVE THE SAME SIDELOCK

The sidelock is perfect. Contraction and expansion is provided for. No solder is used.

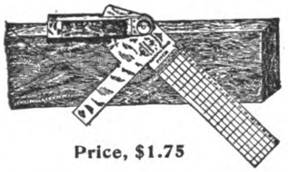
The deep overlap makes a storm proof roof. Light in weight.

Our Metal Shingles are used in all parts of the country. Metal Shingles make a roof ornamental in appearance; a roof that will last indefinitely; a roof that will not leak; will not rattle; reduces the cost of insurance; requires no expert to lay.

They make a better roof than slate because they require lighter framing, will not break, and can be taken off and relaid on another roof without injury or waste.

Our shingles are made of the best quality full weight roofing plates, carefully painted on both sides with the best iron oxide paint mixed with pure linseed oil. The color is dark red.

Galvanized shingles are galvanized after being formed, thereby leaving no raw edges.



Price, $1.75

TOPP'S FRAMING TOOL.

A PERFECT TOOL and the only Tool for the purpose ever invented.

Saves from 8 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

Write for booklet. Address the manufacturers,

G. A. TOPP & CO., - Indianapolis, Ind.

SECURE
PROTECTION AND LONG
SERVICE BY USING OUR
ASPHALT ROOFING
SAVES REPAIRS
SAVES RECOATING
SAVES RENEWING
Send for Samples and Pamphlet
STOWELL MFG. CO.
JERSEY CITY, N.J.

RUBEROID
RED
ROOFING

PAT. NOV. 22, 1904.

FOR 15 YEARS

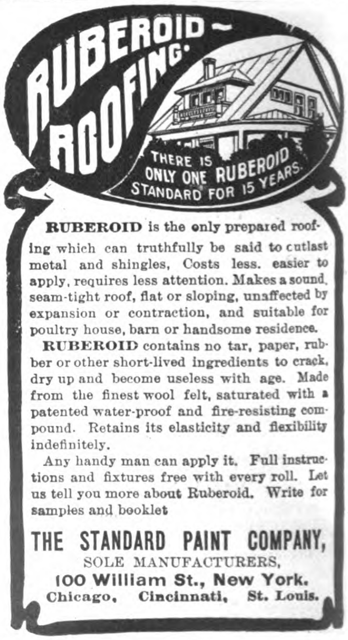
RUBEROID HAS BEEN RECOGNIZED AS THE STANDARD PREPARED ROOFING. AS NOW MADE IN COLORS, RED AND BROWN, IT ENSURES YOU

A PERMANENT ROOFING
WITH
A PERMANENT COLOR.

A COMBINATION OF BEAUTY AND WEATHER AND FIRE PROTECTION. ANY HANDY MAN CAN APPLY IT.

SEND FOR SAMPLES.

THE STANDARD PAINT COMPANY,
Sole Manufacturers,
100 William Street, New York.



RUBEROID ROOFING.

THERE IS ONLY ONE RUBEROID STANDARD FOR 15 YEARS.

RUBEROID is the only prepared roofing which can truthfully be said to outlast metal and shingles, Costs less. easier to apply, requires less attention. Makes a sound, seam-tight roof, flat or sloping, unaffected by expansion or contraction, and suitable for poultry house, barn or handsome residence.

RUBEROID contains no tar, paper, rubber or other short-lived ingredients to crack, dry up and become useless with age. Made from the finest wool felt, saturated with a patented water-proof and fire-resisting compound. Retains its elasticity and flexibility indefinitely.

Any handy man can apply it. Full instructions and fixtures free with every roll. Let us tell you more about Ruberoid. Write for samples and booklet

THE STANDARD PAINT COMPANY,
SOLE MANUFACTURERS,
100 William St., New York.
Chicago, Cincinnati, St. Louis.

We Give Particular Attention To Special Designs

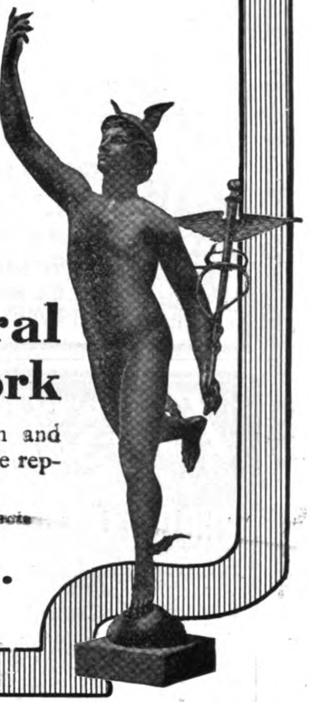
and are fully equipped to execute the most intricate and delicate work ever attempted in sheet metal.

Mullins
Art Architectural Sheet Metal Work

is far in advance in architectural design and artistic execution and has won an enviable reputation for excellence.

Estimates, Designs, etc., submitted to architects builders and contractors on request.

The W. H. Mullins Co.
208 Franklin St., Salem, Ohio.
(Everything in sheet metal.)



The Edwards Metal Shingles

The permanent Roof Covering made in Tin painted or galvanized and Copper having no soldered joints, can be readily taken off of one building and placed on another, if desired. On pitched Roofs of every description the Edwards Shingles, being considerably lighter than slate, and having none of the disagreeable features—*i. e.*, rottening and warping—of wood shingles, are especially recommended

The Edwards Shingles are guaranteed to be absolutely fireproof, and are heartily endorsed by the leading Architects, Builders and Contractors throughout the world.

Write for Shingle Booklet and prices.

The Edwards Manufacturing Co.
"The Sheet Metal Folks"
Main Office and Works: 423 to 443 Eggleston Ave.,
CINCINNATI, OHIO

Manufacturers of the most extensive line of Sheet Metal Building Material in the world.

Carpenters Take Notice!

We have an easy money-making proposition to lay before you.
No investment necessary.
Nothing to interfere with your present work.
Write to-day for particulars.

CORTRIGHT METAL ROOFING CO.
Philadelphia and Chicago.

TOP IT OFF

With our

No. 76 Cresting

and be proud of your roof finish. Send for catalog No. 5 showing a very complete line of architectural metal work.

STEEL CEILING is a leading feature with us.

We make the W. H. Miller Patent Metal Window Frames and Sash. Special catalog on these. Originators of the hip shingles.

WILLIS MFG. CO., - - Galesburg, Ill.

"STAR ENCAUSTIC TILE CO.,"

MANUFACTURERS OF

Superior Unglazed Encaustic Tile

For Floors in Stores, Churches, Depots, Kitchens, Halls, Porches, &c.

Office and Factory, Bluff Street, near Gist,
PITTSBURG, PA.


Eller's
Metal
Stove pipe iron.
Cornice.
Skylights.
Eavestrough.
Conductor pipe.
Steel roofing & siding. Solder etc.
Tin plate Ceilings
The Eller Mfg. Co. successor to J. H. Eller & Co.
Canton, Ohio.


For More Light on the Subject send for our PHOTO-PAMPHLET

PERFECTED GRANITE ROOFING

Combines durability, low price, ease of application, fire-proof qualities and sightliness, just what the buyer of roofing material demands.

The cheapest way to repair old shingle roofs is to cover with **PERFECTED GRANITE ROOFING.**

SEND FOR PHOTO PAMPHLET.

Eastern Granite Roofing Co., Irving Building, New York.

THE PAINT PADDLE

is as far behind the times as the warming pan. The painter who mixes and tints lead by hand charges for the time wasted in performing an ill-done task. His materials are antiquated and his methods mediæval. High-grade ready mixed paint is the logical up-to-date material, and being based largely on OXIDE OF ZINC, will cost less, look better and last longer than rule-of-thumb shop-mixed paints.

. . . FREE . . .
Our Practical Pamphlets:
"The Paint Question."
"Paint; Why, How and When."
"Paints in Architecture."
"Specifications for Architects."
"French Government Decrees."

The New Jersey Zinc Co.,
71 Broadway
NEW YORK

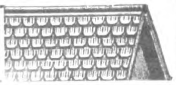
WE DO NOT GRIND ZINC IN OIL. LISTS OF MANUFACTURERS OF OXIDE OF ZINC PAINTS WILL BE FURNISHED ON REQUEST

PRODUCERS OF
ROOFING SLATE
SLATE BLACKBOARDS.

THE E. J. JOHNSON CO.
38 Park Row,
New York.
Quotations delivered anywhere.
Slaters' Supplies,
Snow Guards.
Write for Price Book

MONTROSS METAL SHINGLES

CARPENTERS:— There is plenty of work and big pay laying Montross Shingles. Every new building in your neighborhood should have a Montross roof. Write for our Carpenters' proposition.
MONTROSS METAL SHINGLE CO., Camden, N. J.



THE FOURTEENTH EDITION OF

Kidder's Architects' and Builders' Pocket-Book

Except for two or three chapters this book has been entirely rewritten and is thoroughly up to date. It now numbers 1675 pages and contains upwards of 1000 engravings. This is unquestionably the most complete hand-book in the English Language treating on Building Construction and Structural Engineering, and contains a vast amount of practical and reliable data relating to Builders' work. The subject of reinforced concrete is fully considered and formulas given for strength, etc.

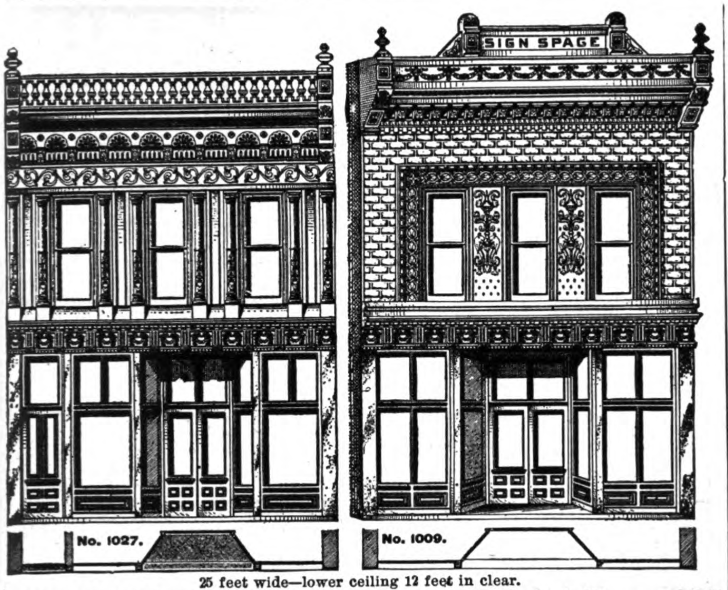
No Architect, Structural Engineer, Contractor or Draughtsman can afford to be without it.

Circular giving table of contents and sample pages mailed on request.

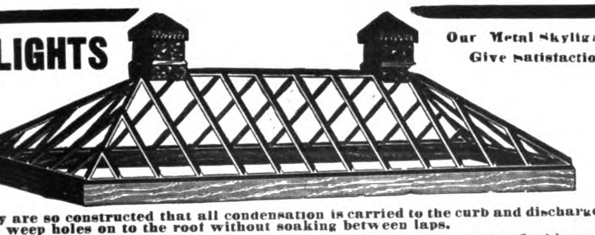
Twentieth Thousand.
1656 pages, 1000 figures.
Morocco, $5.00.

DAVID WILLIAMS CO.
14-16 Park Place, New York

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google


SIGN SPACE
No. 1027.
No. 1009.


520 FEET



**BUY . . . .
LUMBER
DIRECT**

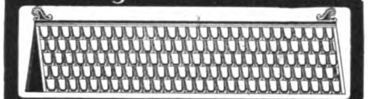
WE MANUFACTURE ALL KINDS.—MOULDINGS, WINDOWS, DOORS, BLINDS. MIXED CARS, INCLUDING EVERYTHING FOR A BUILDING. STRAIGHT CAR-LOADS SHINGLES, SIDING, FLOORING, WHITE PINE, AT WHOLESALE PRICE.

"Our complete Catalog and Price List of all kinds of Building Material would be a great help to you in figuring."

LESTERSHIRE LUMBER & BOX CO., LESTERSHIRE & BINGHAMTON, NEW YORK.

WALTERS'

Shingles that last

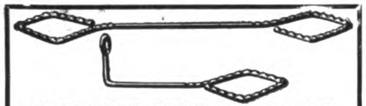


Made from Galvanized Tin and Painted Tin

STORM, RUST AND FIRE PROOF

Do you want to increase your business? THIS IS YOUR OPPORTUNITY. Write for catalogue, samples and prices.

National Sheet Metal Roofing Co.,
JERSEY CITY, N. J.



EXCELSIOR WIRE WALL TIES
Galvanized steel wire. Strong and reliable. In use everywhere. Samples free. Order of your dealer. Agents Wanted. **C. A. Mfg. Co.**, La Salle, Illinois

Lock-Joint Metal Ceiling Is Dust Proof

Dust and dirt will not collect around the joints of a ceiling that is air-tight and dust-proof. An advantage worth considering.

Lock-Joint saves 50 per cent. of the labor of erecting. Another good point.

Send for Catalogue "F"

S. Keighley Metal Ceiling & Manufacturing Co.,
PITTSBURGH, PA.
Boston New York
Washington Baltimore

OUR descriptive catalogue of Building Trades Books will interest every progressive Carpenter and Builder.

DAVID WILLIAMS CO.,
14-16 Park Place N. Y.

Do you insist on using the best? — Investigate and you will find

PEERLESS MORTAR COLORS

The original and standard colors for interior and exterior mortar.

BUCK WHITE LEAD

is recognized as the whitest and most durable of all paints.

WRITE US FOR PAMPHLETS.

SAMUEL H. FRENCH & CO., Paint and Varnish Manufacturers. **Philadelphia.**
Established 1844.

THE "GLOBE" VENTILATOR

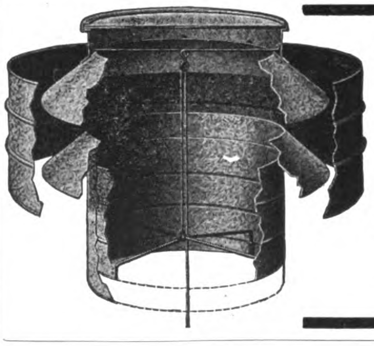
In Brass, Copper, Galvanized Iron and with Glass Tops for Skylight Purposes. Also

"Globe Ventilated Ridging"

For Barns, Residences and Buildings of every character. Far superior to a Cupola.

Send for Description and Price List.

Manufactured by **GLOBE VENTILATOR CO.** Troy, N.Y.

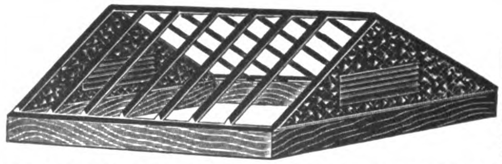


THE "BURT" VENTILATOR

Should interest every sheet metal house. It contains features of merit not possessed by any other ventilator on the market to-day. We want the trade better acquainted with the "Burt," and will be pleased to send our 20 page booklet to any one interested.

THE BURT MFG. CO.
301 Main St., AKRON, OHIO,
U. S. A.

Largest Manufacturers of Oil Filters and Exhaust Heads in the World.



ART METAL CEILINGS

Exclusive and Artistic Designs appropriate for any style of architecture.

All Styles Galvanized and Copper Skylights, Cornices, Finials, Crestings, Ventilators, Metal Shingles, Roof Gutters, all styles painted and galvanized Iron Roofing and Siding, etc. Write for Catalogue and Prices. Estimates free.

Kanneberg Roofing & Ceiling Co.,
Manufacturers,
CANTON, OHIO.

THE NEW YORK STEEL CORNER PLATE CO.

—SUPPLY—

The Parker Steel Corner Bead for the Protection of Plastered Corners

Outlines a perfect corner. The best Corner Bead in the market. Fits any ground.

Endorsed by Leading Architects, Builders and Plasterers.

Telephone 876 Madison Square.

All communications to 1135 B'way, N. Y. C.

STORE ELEVATOR FOR

COMPLETE, READY TO ERECT, MADE BY THE HUNDRED. SIMPLE IN CONSTRUCTION. EASILY CARED FOR. OTHER STYLES AND PRICES TO SUIT.

The Warner Elevator Mfg. Co.
2100 Valley St., CINCINNATI, O.
NEW YORK OFFICE: 2032 PARK ROW BUILDING.

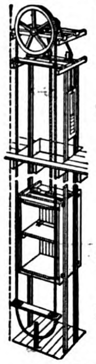
$105

MORSE HAND ELEVATORS and DUMB WAITERS

Smooth Running *Safe* *Durable*

They are sold with or without lumber, and we furnish all the necessary drawings and instructions for erecting. All details free. Write for them.

Morse, Williams & Company
Department of Otis Elevator Co.
PHILADELPHIA ATLANTA BOSTON



DUMB WAITERS AND HAND ELEVATORS.

Trunk Lifts,
Invalid Lifts,
Carriage Elevators,
Freight Elevators,
Sidewalk Elevators,
Hatchway Hoists.

All of most improved design and construction.

Sedgwick Machine Wks.,
88 Carroll Street,
POUGHKEEPSIE, N. Y.
New York Salesroom, 128 Liberty St.

Catalogue on application.
Estimates on request.

Improved Quick and Easy Rising Steam, Electric and Hand Power Safety

ELEVATORS

AND DUMB WAITERS.
Automatic Hatch Gates.
Send for Circulars.

KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kimball Elevator Co., Cleveland, Ohio, 245 Vincent St.
Branch Offices:
120 Cedar St., New York. 108 11th St., Omaha, Neb.

ELEVATOR ENCLOSURES

We are large manufacturers of Elevator cars and Enclosures. Also Bank and Office Grille Work. Window Guards, Ornamental Wire, Iron, Steel and Brass work of every description in any finish. Our workmanship cannot be excelled.

Send for Catalogue.

F. J. MEYERS MFG. CO.
HAMILTON. OHIO. U.S.A.

ELEVATORS AND DUMBWAITERS

that can be placed in position by any carpenter.
Catalogue Free.

Energy Elevator Co.
407 Cherry St., - Phila., Pa.

In Connection with Laying Hardwood Floors

there's a great many fine points. It is a business which involves carefulness and nicety of operation. Apropos: We have just brought out in book form Frank G. Odell's serial article

LAYING and FINISHING HARDWOOD FLOORS

Contains sound direction and advice, being a compilation from recent numbers of CARPENTRY AND BUILDING. A convenient handbook of fifty pages with appropriate illustration and well bound in cloth.

Learn the art, or improve upon what you know by sending us the small price--

FIFTY CENTS, POSTPAID

DAVID WILLIAMS COMPANY, Publisher, 14-16 Park Place, NEW YORK

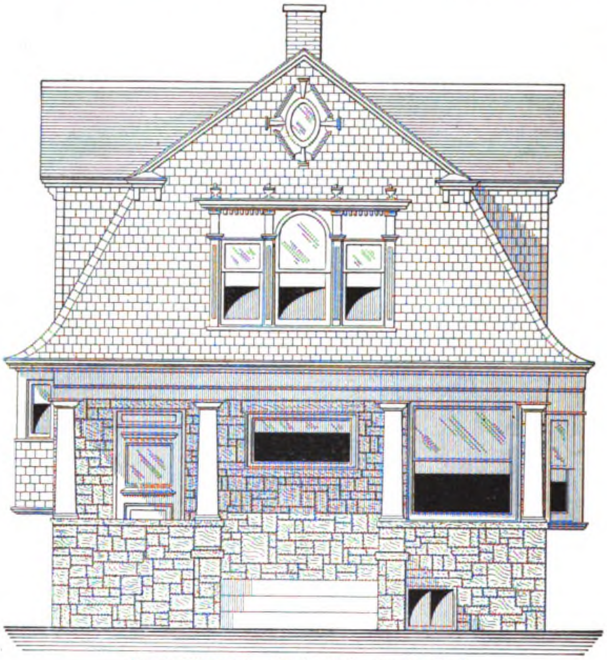
a common fallacy, shared by architects as well as laymen, that a great wide throat insures a good draught, whereas the reverse is true. The narrowing of the throat tends to concentrate the heat of escaping smoke and gas, thereby accelerating their upward movements. Once they have passed this point, the form of the throat prevents their return, no matter how unfavorable the weather conditions. The pocket formed just back of the top of the throat assists in preventing down draughts from entering the throat.

In constructing the back of a fireplace it is important that it should not be drawn forward at all sharply until well up toward the top of the fireplace opening, otherwise, even with an excellent draught, smoke will strike the top of the opening, especially if it is of square cross-section, as is the case with a brick arch, and allowing an occasional puff of smoke to be deflected into the room, particularly when a fresh fire is started.

No matter how carefully and intelligently the architect's drawings for fireplaces may be prepared, vigilant superintendence is required to prevent the masons from deviating from them just enough to interfere with their satisfactory working. Very few masons appear to know how a fireplace ought to be built, but some of the most igonrant are quite ready to tell an architect just how it should be done.

In regard to the dimensions and proportions of fireplace openings, these naturally vary according to the size of the rooms, available space and kind of fuel to be burned. For cordwood or logs a fireplace should be not less than 4 ft. 4 in. wide at the back and wider in front if the sides are flaring. With this width the hight should be about 3 ft.

Some architects hesitate to design openings over 2 ft. 6 in. high, claiming that if made higher they will not draw properly. The writer, however, is positive that 3 ft. or even more is not an excessive hight where the back and front are properly constructed and the depth from front to back sufficient.


Front Elevation.—Scale, ⅛ In. to the Foot.

A Stone Cottage at Boulder, Colo.

Depth as well as hight is subject to variation. For a small bedroom fireplace, intended for a coal grate, a foot in depth is sufficient at a pinch if the draught is good. Where wood is to be burned and the opening is wide, the depth should be not less than 21 in., and may be as much as 30 in.

In the building of chimneys and fireplaces construction and design should be closely interwoven. Very often, however, the planning of the house as to the location of fireplaces is more important than the design of the fireplace itself. Generally speaking, outside chimneys are to be avoided in houses of moderate cost, where economy of construction and of fuel is an important consideration. An inside chimney is usually cheaper to build, and in many houses, when a central chimney may be made to serve every purpose.

There are many cases, however, where it is advisable, if possible, to locate the living room fireplace in an outer wall. For example, in a symmetrically planned room, which is entered on its axis from the hall, an inside fireplace is often out of the question.

Since large living rooms have become the vogue, it often happens that this room has three outside walls, while the inner wall is largely cut away by openings to hall and dining room or library. In such a case a fireplace on the inner wall would be not only crowded for space, but would not have sufficient privacy. In locating a living room fireplace it must be remembered that those sitting about it must not be disturbed by those entering the room or passing to and fro.

The desirability of a degree of privacy round the fireplaces explains the charm of the so-called "ingle-nook," a feature which, by the way, has been abused not a little, through being attempted on too small a scale, and the advantages of which are, to a degree, offset by the fact that a deeply recessed fireplace does not radiate its warmth and cheer as effectively as one placed flush with or projecting from the wall.

As to the desirability of a dining room fireplace, it is a question of conditions of climate, aspect and space. In the small dining room a fireplace, if used, is apt to cause discomfort to those sitting near it at the table. If not intended for use it is a mistake under any condition. It often happens, however, in our changeable and trying Northern climate that a dining room cannot be so placed as to receive the morning sun. If properly recessed in a dining room of fair size a small fireplace is therefore often a comfort and a delight. There are many raw and frosty mornings before furnace fires are started in the fall, when one would rather breakfast in the kitchen than eat with numb fingers in a fireless, sunless dining room.

In houses heated by steam or hot water, where ventilation is usually inadequate, bedroom fireplaces are always good to have, although not needed for warmth. Even in a small house one bedroom fireplace is often a great comfort, particularaly in times of sickness.

In recent years brick fireplaces, simply and honestly built, have grown rapidly in popularity, partly due perhaps to the Colonial revival, although more largely perhaps to the remarkable development of the face brick industry, which has given us a great variety of beautiful shades and textures from which to choose.

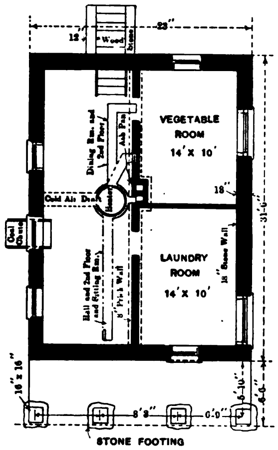
Some of the most beautiful of these modern bricks are of fire clay. These include not only the red paving brick, but the so-called "stiff mud" process bricks, varying in color from delicate cream or light stone color to the deepest bronze. These bricks resist fire quite as easily as the old-fashioned fire bricks, and may be used throughout, both for backs and hearths, without risk of damage under the severest use.

For the sake of harmony brick fireplaces should have brick hearths, although with the rougher bricks it is difficult to give a good surface, in which case plain, dull tiles of the same color may be used with good effect.

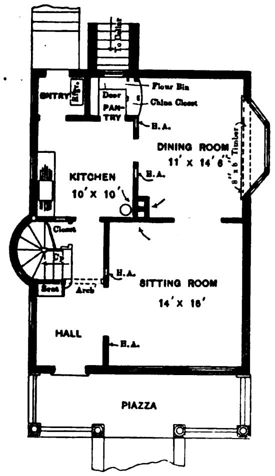
A common tradition of fireplace design which we are partly outgrowing is that we must invariably have some sort of a shelf to serve as a place of deposit for objects

for which no other convenient place can be found, and which is apt to be overloaded with miscellaneous things, some of which might well be thrown away.

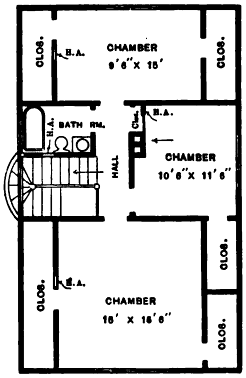
In choosing brick for a fireplace it is important that there should be a considerable variety of tint. It is to their variation of tone and color that the rather coarse and rough paving brick owe their popularity. They are, however, scarcely refined enough for a room which makes some pretensions to elegance of design or finish, and, as a rule, it is safer and not much more expensive to use the smoother and more finished "stiff mud" bricks, which are always sufficiently varied in color and soft in texture, having usually a somewhat more or less speckled or mottled surface.



Foundation.



First Floor.



Second Floor.

A Stone Cottage at Boulder, Colo.— *Floor Plan.*—*Scale*, 1-16 *In. to the Foot.*

For highly finished interior brick of the so-called Roman shape are more delicate and refined in appearance than those of standard dimensions.

In connection with interiors of a dainty or elegant character, tile, marble or mosaic may be employed with equallly good effect for fireplace facings and hearths.

Stone lends itself to a sort of large and monumental or sculptured treatment, where money may be lavishly spent. With all of these materials, excepting brick, firebacks of iron or fire brick must be provided.

In England and Germany, where artistic craftsmanship has reached a high standard and where economy of fuel demands that the fireplaces shall be comparatively small, many beautiful and original ones have been built with hoods of wrought and hammered metal. These hoods are always effective in taking care of smoke, and, as a feature of fireplace design, offer many interesting possibilities to the architect.

Unglazed tiles of American manufacture are satisfactory and durable for fireplace work. The highly glazed tiles are difficult to handle artistically, the softer semi-glazes, with their velvety surfaces, being decidedly preferable. Highly glazed tile of American make are liable to crack and craze, and therefore only the best English product should be used.

Of these English tiles there are a great variety, good in design, texture and color, but no little skill and taste is required in selecting and arranging them effectively.

Very rich and effective fireplace facings may be made of either glass or ceramic mosaic in dull vitreous and iridescent surfaces and colorings, varied with gold enamel and mother of pearl, at a cost not at all extravagant for houses of the better class. Ceramic or glass mosaic may often be employed as an inlay with tile.

A great deal of money is spent upon elaborately carved architectural ornament in the woodwork of fireplaces which might be employed to much better purpose if invested in original sculpture or decorative paintings.

There are a great many painters and not a few sculptors who would be glad of an opportunity to do work of this sort at prices well within the reach of any one able to build a house costing $8000 or $10,000. The writer knows personally of a number of talented young artists who would be very glad of such opportunities, and who would be satisfied with a moderate compensation in order that their works might have an architectural setting instead of being hung upon the wall in heavy gilt frames.

No part of the room affords a better setting for a fine picture than the space above the open fire. As to whether a panel painted for such a space should be painted in a purely pictorial or a more or less conventional or decorative manner is a question beyond the limits of these pages.

The same question, of course, arises in connection with sculpture, which must in the very nature of the medium employed be at least to a considerable degree conventional.

While suggesting that sculptors and artists be more frequently employed in beautifying our fireplaces, the writer does not wish it to be inferred that they should confine their activities to this particular feature of the home, and may at another time take up the question of painting and sculpture as applied to domestic architecture and decoration.

◆

Some Observations on Cement Houses.

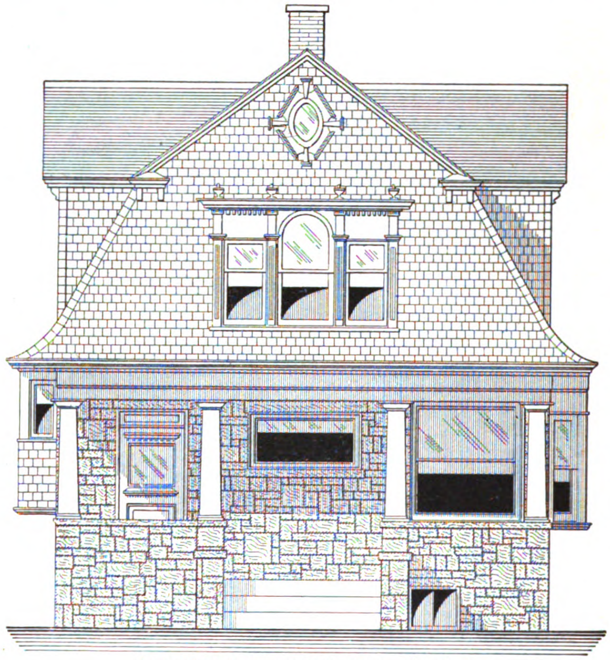
A bit of humor now and then is relished by the most of men, whether they be engaged in the building line or in some other business, and what we here present, apropos of the growing use of cement concrete building blocks, is likely to be appreciated by many of our readers.

In current issues of the New York *Evening Telegram* have appeared observations on various topics by "Pro-

a common fallacy, shared by architects as well as laymen, that a great wide throat insures a good draught, whereas the reverse is true. The narrowing of the throat tends to concentrate the heat of escaping smoke and gas, thereby accelerating their upward movements. Once they have passed this point, the form of the throat prevents their return, no matter how unfavorable the weather conditions. The pocket formed just back of the top of the throat assists in preventing down draughts from entering the throat.

In constructing the back of a fireplace it is important that it should not be drawn forward at all sharply until well up toward the top of the fireplace opening, otherwise, even with an excellent draught, smoke will strike the top of the opening, especially if it is of square cross-section, as is the case with a brick arch, and allowing an occasional puff of smoke to be deflected into the room, particularly when a fresh fire is started.

No matter how carefully and intelligently the architect's drawings for fireplaces may be prepared, vigilant superintendence is required to prevent the masons from deviating from them just enough to interfere with their satisfactory working. Very few masons appear to know how a fireplace ought to be built, but some of the most igonrant are quite ready to tell an architect just how it should be done.



Front Elevation.—Scale, ⅛ In. to the Foot.

A Stone Cottage at Boulder, Colo.

In regard to the dimensions and proportions of fireplace openings, these naturally vary according to the size of the rooms, available space and kind of fuel to be burned. For cordwood or logs a fireplace should be not less than 4 ft. 4 in. wide at the back and wider in front if the sides are flaring. With this width the hight should be about 3 ft.

Some architects hesitate to design openings over 2 ft. 6 in. high, claiming that if made higher they will not draw properly. The writer, however, is positive that 3 ft. or even more is not an excessive hight where the back and front are properly constructed and the depth from front to back sufficient.

Depth as well as hight is subject to variation. For a small bedroom fireplace, intended for a coal grate, a foot in depth is sufficient at a pinch if the draught is good. Where wood is to be burned and the opening is wide, the depth should be not less than 21 in., and may be as much as 30 in.

In the building of chimneys and fireplaces construction and design should be closely interwoven. Very often, however, the planning of the house as to the location of fireplaces is more important than the design of the fireplace itself. Generally speaking, outside chimneys are to be avoided in houses of moderate cost, where economy of construction and of fuel is an important consideration. An inside chimney is usually cheaper to build, and in many houses, when a central chimney may be made to serve every purpose.

There are many cases, however, where it is advisable, if possible, to locate the living room fireplace in an outer wall. For example, in a symmetrically planned room, which is entered on its axis from the hall, an inside fireplace is often out of the question.

Since large living rooms have become the vogue, it often happens that this room has three outside walls, while the inner wall is largely cut away by openings to hall and dining room or library. In such a case a fireplace on the inner wall would be not only crowded for space, but would not have sufficient privacy. In locating a living room fireplace it must be remembered that those sitting about it must not be disturbed by those entering the room or passing to and fro.

The desirability of a degree of privacy round the fireplaces explains the charm of the so-called "ingle-nook," a feature which, by the way, has been abused not a little, through being attempted on too small a scale, and the advantages of which are, to a degree, offset by the fact that a deeply recessed fireplace does not radiate its warmth and cheer as effectively as one placed flush with or projecting from the wall.

As to the desirability of a dining room fireplace, it is a question of conditions of climate, aspect and space. In the small dining room a fireplace, if used, is apt to cause discomfort to those sitting near it at the table. If not intended for use it is a mistake under any condition. It often happens, however, in our changeable and trying Northern climate that a dining room cannot be so placed as to receive the morning sun. If properly recessed in a dining room of fair size a small fireplace is therefore often a comfort and a delight. There are many raw and frosty mornings before furnace fires are started in the fall, when one would rather breakfast in the kitchen than eat with numb fingers in a fireless, sunless dining room.

In houses heated by steam or hot water, where ventilation is usually inadequate, bedroom fireplaces are always good to have, although not needed for warmth. Even in a small house one bedroom fireplace is often a great comfort, particularaly in times of sickness.

In recent years brick fireplaces, simply and honestly built, have grown rapidly in popularity, partly due perhaps to the Colonial revival, although more largely perhaps to the remarkable development of the face brick industry, which has given us a great variety of beautiful shades and textures from which to choose.

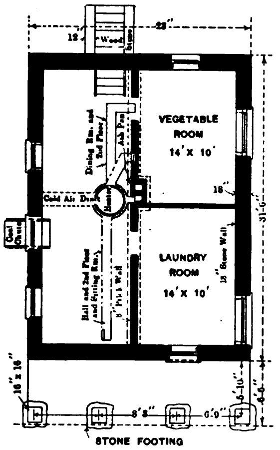
Some of the most beautiful of these modern bricks are of fire clay. These include not only the red paving brick, but the so-called "stiff mud" process bricks, varying in color from delicate cream or light stone color to the deepest bronze. These bricks resist fire quite as easily as the old-fashioned fire bricks, and may be used throughout, both for backs and hearths, without risk of damage under the severest use.

For the sake of harmony brick fireplaces should have brick hearths, although with the rougher bricks it is difficult to give a good surface, in which case plain, dull tiles of the same color may be used with good effect.

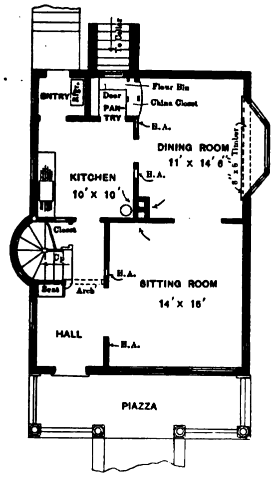
A common tradition of fireplace design which we are partly outgrowing is that we must invariably have some sort of a shelf to serve as a place of deposit for objects

for which no other convenient place can be found, and which is apt to be overloaded with miscellaneous things, some of which might well be thrown away.

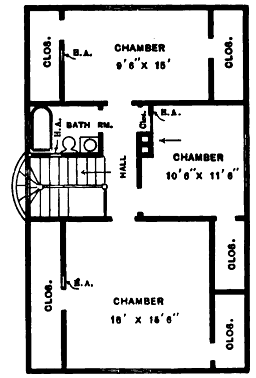
In choosing brick for a fireplace it is important that there should be a considerable variety of tint. It is to their variation of tone and color that the rather coarse and rough paving brick owe their popularity. They are, however, scarcely refined enough for a room which makes some pretensions to elegance of design or finish, and, as a rule, it is safer and not much more expensive to use the smoother and more finished " stiff mud " bricks, which are always sufficiently varied in color and soft in texture, having usually a somewhat more or less speckled or mottled surface.



Foundation.



First Floor.



Second Floor.

A Stone Cottage at Boulder, Colo.—Floor Plan.—Scale, 1-16 *In. to the Foot.*

For highly finished interior brick of the so-called Roman shape are more delicate and refined in appearance than those of standard dimensions.

In connection with interiors of a dainty or elegant character, tile, marble or mosaic may be employed with equallly good effect for fireplace facings and hearths.

Stone lends itself to a sort of large and monumental or sculptured treatment, where money may be lavishly spent. With all of these materials, excepting brick, firebacks of iron or fire brick must be provided.

In England and Germany, where artistic craftsmanship has reached a high standard and where economy of fuel demands that the fireplaces shall be comparatively small, many beautiful and original ones have been built with hoods of wrought and hammered metal. These hoods are always effective in taking care of smoke, and, as a feature of fireplace design, offer many interesting possibilities to the architect.

Unglazed tiles of American manufacture are satisfactory and durable for fireplace work. The highly glazed tiles are difficult to handle artistically, the softer semi-glazes, with their velvety surfaces, being decidedly preferable. Highly glazed tile of American make are liable to crack and craze, and therefore only the best English product should be used.

Of these English tiles there are a great variety, good in design, texture and color, but no little skill and taste is required in selecting and arranging them effectively.

Very rich and effective fireplace facings may be made of either glass or ceramic mosaic in dull vitreous and iridescent surfaces and colorings, varied with gold enamel and mother of pearl, at a cost not at all extravagant for houses of the better class. Ceramic or glass mosaic may often be employed as an inlay with tile.

A great deal of money is spent upon elaborately carved architectural ornament in the woodwork of fireplaces which might be employed to much better purpose if invested in original sculpture or decorative paintings.

There are a great many painters and not a few sculptors who would be glad of an opportunity to do work of this sort at prices well within the reach of any one able to build a house costing $8000 or $10,000. The writer knows personally of a number of talented young artists who would be very glad of such opportunities, and who would be satisfied with a moderate compensation in order that their works might have an architectural setting instead of being hung upon the wall in heavy gilt frames.

No part of the room affords a better setting for a fine picture than the space above the open fire. As to whether a panel painted for such a space should be painted in a purely pictorial or a more or less conventional or decorative manner is a question beyond the limits of these pages.

The same question, of course, arises in connection with sculpture, which must in the very nature of the medium employed be at least to a considerable degree conventional.

While suggesting that sculptors and artists be more frequently employed in beautifying our fireplaces, the writer does not wish it to be inferred that they should confine their activities to this particular feature of the home, and may at another time take up the question of painting and sculpture as applied to domestic architecture and decoration.

Some Observations on Cement Houses.

A bit of humor now and then is relished by the most of men, whether they be engaged in the building line or in some other business, and what we here present, apropos of the growing use of cement concrete building blocks, is likely to be appreciated by many of our readers.

In current issues of the New York *Evening Telegram* have appeared observations on various topics by " Pro-

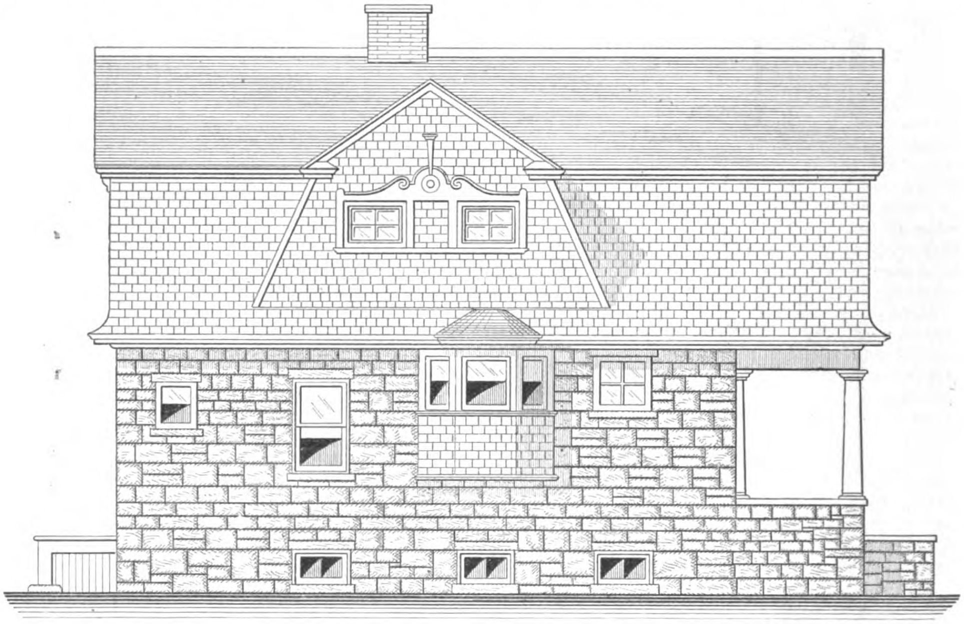
fessor Wigglestaff," and in a late number he commented as follows on "Cement Houses":

We are, after all is done and said, a home loving people. We like to build ourselves a new house every now and then, and when we get all settled down we rather enjoy going around and trying to break up some other fellow's old one.

This, by the bye, is the building season, but we are all mixed up as to what building material to use. When we first started out in life we used to build our homes out of air; then we used hot air and pressed brick. The bricks were all right, but nowadays it costs so much to keep them pressed and looking decent! Wood is just as bad. If you don't give it a fresh "make up" of paint and powder every spring the home gets wrinkles under the eyes and soon looks like a regular old hag.

These conditions, then, bring us down face to face with the concrete home age of cement, sand and cinders. Dugouts, cave cottages, cliff dwellings, &c., were all right in their day, but we are living in the "imitation stone age."

If you are not yet wise on the cement home scheme, why mix right in now, before the ground floor hardens down. Just cut out that little old fashioned vine clad "cot" dream, with moss covered shingles on it, and get down to "fake stone."



Side (Left) Elevation.—Scale, ⅛ In. to the Foot.

A Stone Cottage at Boulder, Colo.

What you really need is an artificial stone palace with a concrete porch, inlaid with hand made pearls and supported by reinforced Roman fluted cement columns which are reproduced from the Vatican. The main floor should be done in box pleated granite, with a suggestion of counterfeit gold running through it and trimmed in bogus onyx. All the baths should be of second story Grecian marble, and the bedsteads must be "carved" out of North Carolina flint, with Vermont cobblestone mattresses, which are as hard and natural as the real thing.

In the rear of the palace you need a real hand-me-down Italian garden, composed of Atlantic City sand, two parts of Portland cement, three parts of Paris green gravel and a bucket of Croton water, strained.

There is absolutely no limit to the molded stone home. People who live in cement houses can throw all the stones they like. They are bombproof, fireproof and scandal-plated. Everything in the cement house, including yourself, your wife and children, dog and automobile, can burn up, and still they say "these monolithic walls will stand intact." What more can the homeseeker ask for? When your friends come around to see the funeral of yourself and family you'll have the satisfaction of knowing that they said: "Well, he left a good home. He built it right when he did build."

You don't have to depend on union labor to build your modern cement home. Any child who knows how to make good old fashioned mud pies can learn to make the latest style building blocks in 10 minutes. While you are slaving away at the office and sending out your salary by a messenger boy to lose in the pool rooms, your wife and children can be in the country making the building material for the new and enlarged home which you hope to put up in the summer if your horse wins.

They tell us that the Eskimo chops up snow blocks and his wife piles them into a snow house, but the Yankee cement block house has the Eskimo house building gag frozen to the North Pole.

The standard and unabridged recipe for making cement building blocks is thus:

"Get a small box of wet rocks or gravel. Pour in hot water until the box is full. Then pour the water off and measure it. This gives you the relation of the voids to be filled by sand and cement." Some people then add a little salt and pepper and begin building at once. Others wait until the thaw comes.

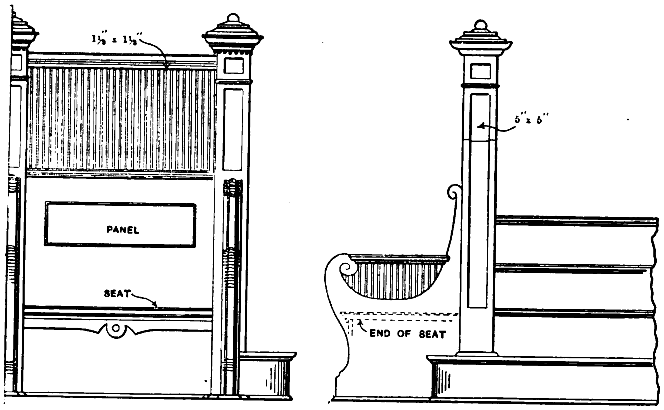
You should be very careful about your proportions. The legal proportions are:

"One quart of cement, two cups of sand, four teaspoonfuls of broken stone, two granulated egg shells, a quarter of a pound of coffee grounds (if you want a coffee colored house). Stir well, beat the composition into an insensible shape, being governed all the time of course by the architect's designs, and place in the sun in the back yard to dry and harden.

"If the sun never shines where you live, place in a stone dish and bake in a get-hot-quick oven."

When you have enough building blocks on hand you can use them in many ways. They are good for small homes, office buildings, dams, to throw at cats, or almost anything. As yet they have not been used for building yachts, but for fence posts, tombstones, &c., they are great. You can have the tomb of the old Napoleon reproduced for your own use in "20,000-year guaranteed" concrete for $7.29. They will put it up anywhere on the map, even in Brooklyn, without extra charge. If you want a famous old castle of Europe reproduced in cement or rein-

forced concrete it will be about $17.50. You see, one of the features of the cement home is the cheapness thereof. Engineers have been discussing the problem of water.



Details of Main Stairs.—Scale, ½ In. to the Foot.

They are divided on how much water to use in their cement. We take ours plain. It seems to set better and we can use more of it at one time.

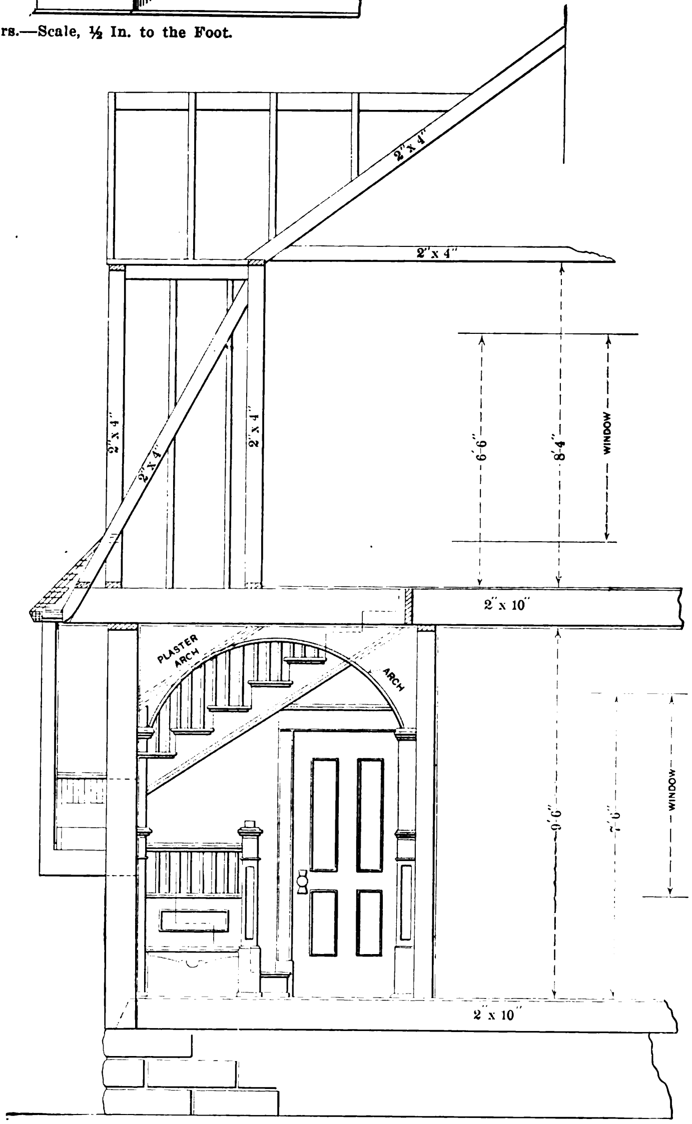
One of the most important parts of the exercise of building your own cement home is the "tamping." We don't know what this consists of, but we have given it serious consideration and have finally come to the wise conclusion that this part should be left to the wife. Otherwise she will not take so much interest in the home building.

While performing the mixing trick, preparatory to doing the block casting, be careful lest some of the domestic animals about the place get near the mixing machine. A tomcat or a chicken in bas relief above your swell window or front door would not add to the home decorations.

One of the nice things about a cement home is its strong resemblance to the mausoleums of the rich, in the society cemeteries. There is another satisfaction in putting up a cement house. If you get yours first, it will be the only one on the street. When your neighbors, who are thinking of building, see it, they will stick to frame or brick.

When your friends call in the summer time they will say: "Oh! What a nice, cool, 'damp' home you have." But in the winter time you can get even with them on that "damp" remark. All you have to do is to start your fires, say in October, and by the following spring all the 2-ft. thick cement walls will be heated through and through and every room will be as warm as toast. Should we have another civil war you might be able to rent your stone jail to the Government for a fort.

This country hasn't been destroyed many times by earthquakes since cement came in, but the *Engineers' Guess Work Journal* gives it out as official that any ordinary earthquake would get tired before it shook down a cement cottage. As for the cement sky-scraper, they say an earthquake or cyclone would go around another way rather than tackle a modern cement office building or hotel.



Vertical Section through Building.—Scale, ¼ In. to the Foot.

Miscellaneous Constructive Details of a Stone Cottage at Boulder, Colo.

◆

SOME RECENTLY DISCOVERED RUINS in Rhodesia, Africa, show that 2000 years before the Christian era a people dwelt there who were capable architects, skillful artisans providing "water furrows" and a system of irrigation. This calls to mind the interesting facts brought out in excavations in Macedonia, where evidences were many that either little was known of sewage disposal or else a great deal. The observations showed how sewage, reaching to a great depth underground, had remained for ages without material reduction, indicating that the bacteria had become overcrowded and inactive.

slip any more than a bowline will, but it is a little harder to untie.

Fig. 27 shows how this knot is tied. Commence by laying the end of the rope over the standing part, as in the bowline, then bring it around behind and down through the bight, as in the figure eight or Flemish knot; bring it up again and down through its own bight as shown by the arrow.

This brings us to the end of the loop knots, and if we now compare these knots with those immediately preceding (knots for joining ropes) we shall find that the fisherman's eye is formed by means of the fisherman's knot, and that the bowline knot and running knot with crossed ends, are nothing but adaptations of the sheet-bend. It is a good thing to examine and compare knots in this way, as it makes us more familiar with their formation, and fixes them better in our memories. It will also teach us how we may adopt different forms of knots to the peculiar requirements of the moment. For instance, the bowline knot will teach us how easy it is to attach the end of a line rigidly to any portion of a loop or sling by means of a sheet bend.

We shall now examine some of the more important of the hitches, though it is hard to define exactly where knots end and hitches commence. The sheet bend is a hitch, though it is exactly the same as the weaver's knot, while the clove hitch when tied around a pole becomes a builders' knot, and the timber hitch shown in Fig. 28 if slipped off the end of the plank and pulled tight is a Flemish or figure eight knot.

When tying the timber hitch most people pass the end more times than is shown in Fig. 28, but if the knot is properly made this is hardly ever necessary except perhaps in the case of a very small rope.

Fig. 23.

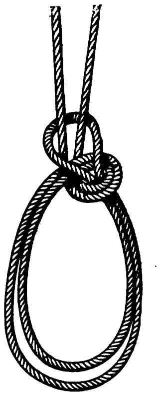


Fig. 24.

Fig. 20.

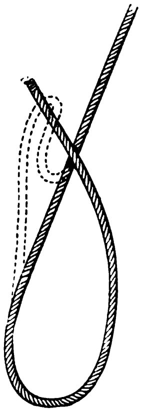


Fig. 21.

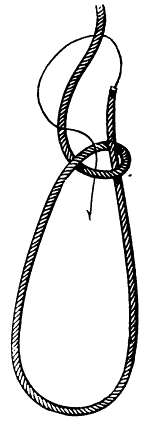


Fig. 22.

Figs. 20, 21, 22 and 23.—Bowline Knot and Methods of Tying.

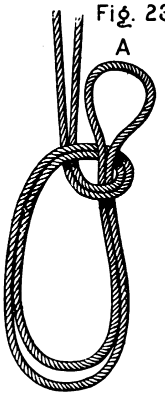


Fig. 25.

Fig. 26.

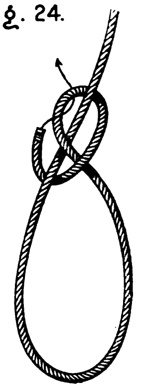


Fig. 27.

Figs. 24 and 25.—Bowline in a Bight, and Methods of Tying.
Fig. 26.—" A Running Knot with Crossed Ends."
Fig. 27.—Method of Making the Knot.

Knots, Hitches and Splices for the Building Mechanic.—II.

History does not record the name of the inventor of the combination of two half hitches shown in Fig. 29 and known as the clove hitch; but it is very certain that whoever he was or whatever his name, " he builded better than he knew," for it is one of the most useful fastenings in the whole catalogue, and its capabilities are not nearly so well known as they ought to be. One of the best points about it is that it will bear a strain equally well on either side of the knot; another is that it can be tied around the standing part of a larger rope, or around a pole, and when so tied has no tendency to slip endways. When tied around a pole it becomes, as already stated, a builders' knot, and is the commencement of all knots used in pole scaffolding.

The knot shown in Fig. 29 looks very simple to make and really is so if you go the right way about it, but if you do not thoroughly learn how it is done, some day when you want to use it you will be surprised at the number of different combinations of two half hitches you are able to make without getting a clove hitch. In order to make it as represented in Fig. 29 take the rope in both hands, with the backs of the hands uppermost, and with the thumb and first finger of the right hand twist the rope away from you, at the same time bringing the hands together, and it will be found that the first hitch thus forms of itself. Hold this with the left hand, make another hitch in the same manner with the right hand, and lay the second hitch on top of the first. When made in this way the hitch would be dropped over the top of the pole or whatever it was to be fastened to.

To tie it around the pole as shown in Fig. 30 commence at the bottom with the rope on your own side of the pole, the left hand holding it close to the pole at A, pass the rope around the pole with the right hand, bring it under at A and hold it here with the left hand, pass the rope around once more with the right hand and put the end under its own part.

The dotted lines in Fig. 30 show how a bracing pole would be tied to an upright. The knot would be in the middle of the rope, and the ends would be passed in opposite directions a number of times through all of the angles formed by the two poles and finally finished off with a reef knot. Rope and pole scaffolding is all right in its proper place and especially good for working in large halls, churches or theatres, its greatest disadvantage being the large initial expense for material.

The clove hitch is used to fasten the ratlins to the shrouds on board ship, forming the rope ladders by means of which the sailor makes the first part of his journey aloft. It can also be used to fasten the guys to the top of a temporary derrick pole (gin pole?). Have two ropes each long enough to make two guys, make a clove hitch in the middle of each rope and drop it over the top of the pole. When upending heavy columns we can attach a line in this manner to the top of the col-

umn, to be used as a tag line for guiding it in its ascent.

The clove hitch is just the thing to use to fasten a couple of short pieces of rope to a heavy stick that is to be used as a battering ram. With a piece of steel rail hung like this and enough men to swing it you can certainly make things move. I have seen an old box tube bridge that we could not move with a 250-ton hydraulic jack lifted by means of wedges that were driven with this style of a battering ram.

There are many other uses for this famous hitch, but enough has been said to give an idea of its capabilities and to show that it is a good thing to remember.

The bag knot shown in Fig. 31 is something like the clove hitch. I think the alteration has been made so that it might be tied quicker. It is another of those knots in which practice makes perfect. If you watch a man who "knows how" tie this knot, he merely seems to twist the twine twice round the neck of the bag and pull tight. Fig. 32 shows how it is tied. Commence as with the builders' knot, but put the first finger of the left hand under the twine, and when you bring the twine around the first time pass it over this finger. The second time around pass the end under the first turn, where the finger of the left hand makes a place for it, catch hold of the two ends and pull tight. For the sake of clearness I have shown this knot tied around a pole instead of a bag, and in Fig. 32 it is shown tied on this side of the pole, but in practice the tier leans over the top of the bag and the knot is formed on the other side.

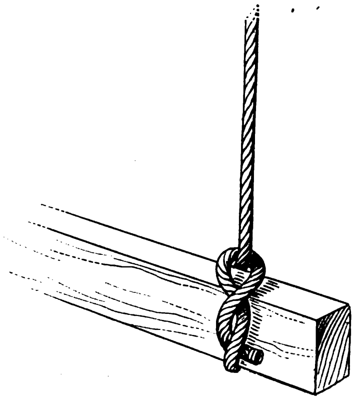


Fig. 28.—Timber Hitch.

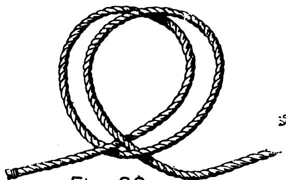


Fig. 29.

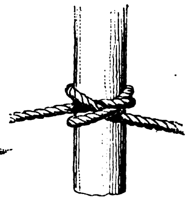


Fig. 31.

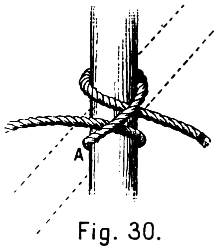


Fig. 30.

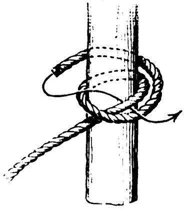


Fig. 32.

Fig 33.

Fig. 29.—The Clove Hitch.
Fig. 30.—Builders' Knot.
Fig. 31.—The Bag Knot.
Fig. 32.—Showing How the Knot Is Tied.
Fig. 33.—The Rolling Hitch.

Knots, Hitches and Splices for the Building Mechanic.—II.

There are different forms of the rolling hitch (also called stopper hitch) shown in Fig. 33, but the one shown is as good as any. It is used for hitching a small rope to a larger one, where extra power is required as in tightening the guy ropes of a derrick, or for holding the strain on the fall of a tackle when shifting it over the drum of a crab or windlass.

The end A and the large rope are generally held in the hand, which permits of quicker tying or untying, or the end A may be fastened by means of a clove hitch. Indeed a clove hitch may be used alone and will generally be found all sufficient. Where the tackle is pulling horizontally and only the slack of the rope is to be held, it can sometimes be easily managed by jamming the rope in the block with the point of a bar or peavey.

◆◆◆

ACCORDING to an account in the Yorkshire *Post*, during some excavations at Dewsbury the opening has been found of a secret passage, which extended from the Manor House gardens, opposite the town hall, across what is now Leeds road, beneath Manor place gardens, and (it is believed) beneath the dwelling to a house known as the "haunted house." Manor House formerly belonged to John Peables, and his gardens, noted for their extent and beauty, included in their limits the so-called haunted house, and this passage is believed to have been built as affording a means of escape in case Manor House was besieged by the Parliamentarians. If this surmise is correct it forms an interesting justification of the incidents imagined by Scott in "Kenilworth," where the coming and going of people through secret passages led to the inference that the house was haunted.

◆◆◆

Building Materials in San Francisco.

During July there was a considerable increase in the arrivals of nearly all classes of building materials, and since the end of that month some improvement has been made in unloading the thousands of carloads of freight that have for some weeks congested the railroad yards in San Francisco and Oakland and filled the side tracks for 100 miles in every direction with loaded cars, says our special correspondent writing under date of August 7. Nevertheless, it will take several weeks at least to relieve this congestion and deliveries of building materials by rail from the East will necessarily be rather slow. Fair quantities of certain materials, however, including cement, structural steel, tiles and plumbing supplies, are coming in by steamer and sailing vessels via the Isthmus and Cape Horn routes, with comparatively quick dispatch. There is still quite a shortage in builders' hardware and many items of plumbers' sundries that will be gradually relieved as the freight blockade is cleared. Receipts from Pacific Coast sources of lumber, brick, &c., have been cut off absolutely for the present by the recent order of the Southern Pacific Railroad Company that no shipments of freight of any kind destined from points up and down the coast to San Francisco should be received until further orders. This will not affect rail shipments from the East, and the order may not remain in force much longer, as it is merely intended to cause more rapid unloading of cars by local consignees, thus releasing the company's cars.

A feature of the lumber situation is that the quantity arriving now by sea is greater than can be promptly received by consignees with the limited wharf room and teams now available. Lumber prices, both wholesale and retail, have continued to advance steadily, and there is much complaint that this is caused by a combine or trust. Since the fire retail dealers have been continually offering a bonus of $1 above the list price for prompt deliver-

ies, builders being particularly anxious, owing to the threatened lumber shortage. The prolonged strike of the sailors on the coasting lumber vessels makes the lumber supply precarious, although the arrivals during July showed a considerable increase, something like 70,000 feet having come in. Contractors state that the receipts at present are just about adequate for immediate needs in a hand-to-mouth way, but that no stocks are accumulating in the yards to provide for the winter season when water shipments will be more difficult to make.

The brick supply is said to be sufficient for present requirements. With the immense quantities of old brick in the ruins in the burned district and the large combined capacity of the common brick plants now in operation there should be no scarcity during the remainder of this year. The plants producing the best quality of pressed brick will probably be able to increase their capacity before next spring in time to take care of the expected building boom.

It is likely that the numerous arrivals of cement during the next month or two will be almost sufficient for present needs, but the demand will then rapidly increase. A great many erroneous reports have been published as to the cement situation in San Francisco, and nearly everybody who could secure a shipload of cement from any cement mill in Europe, Japan or Australia and tonnage for transportation, seems to have become an importer. The result is that this port will be flooded with good, bad and indifferent cement for a year to come. Most of this will undoubtedly find purchasers at varying prices, depending upon the quality and the condition in which it is found when the big demand comes on. Undoubtedly many concrete foundations for high class buildings will be put in this fall and a number of stone, brick and reinforced concrete structures will be well under way before winter. The amount of cement that will go into actual consumption before the rainy season curtails the amount of work that can be done is difficult of prediction. Some of the importers estimate that nearly 400,000 barrels of foreign cement are now on the way to San Francisco by water and an equal amount will be loaded into vessels that are due to arrive on the coast before January 1. In view of these conditions prices of cement should be more reasonable this winter, although the best brands are still bringing high prices. A good deal of the cement en route is already sold.

Efflorescence on Brick Walls.

It is a well-known fact that the appearance of brickwork is often greatly marred by the efflorescence which shows upon its surface, and various have been the efforts to ascertain some means or process by which the difficulty could be remedied. One of the latest investigators into the causes of efflorescence is J. C. Jones of the University of Illinois, who has been looking into the matter and finds the unsightly appearance of brickwork to be due to the following: 1. Soluble salts contained in the clay as mined. 2. Soluble salts developed in the clay by weathering. 3. Soluble substances formed in the clay during burning, partly by chemical changes among the ingredients of the clay itself, and partly by interaction between the materials of the clay and the kiln gases. 4. Soluble salts in the mortar used to bind the bricks in the wall. 5. Soluble substances developed by reactions between the ingredients of the mortar and those of the clay. 6. Soluble salts in the water used in the manufacture of brick or mortar. 7. Soluble salts in the soil or substances lying against the wall.

He finds that efflorescence usually is made up of sulphates and carbonates, with occasionally salts of other acids which are carried to the surface of the bricks by the evaporation of water which has entered them.

The suggested cures are: 1. The use of clay which has not been weathered. 2. To weather the clay and then wash out all soluble salts. 3. To change soluble into insoluble salts by introducing some precipitating agent, as barium. 4. To remove efflorescence which has been formed in the kiln by alternating oxidizing with reducing conditions during the latter part of the burn. 5. To coat the bricks as they come from the machine with some organic substance. 6. To burn the bricks so that they will absorb the smallest possible amount of water. 7. To coat those portions of the wall below the ground with waterproof paint. 8. To see that the gutters and flues which carry water or steam pipes are so constructed that water cannot reach the walls. 9. To make mortar joints as thin as possible and use mortar which is free from sulphur or nearly so.

CONVENTION OF MASTER SHEET METAL WORKERS.

THROUGH the untiring efforts of Secretary W. H. Barnard the attention of master sheet metal workers all over the country was attracted to Indianapolis, where on Wednesday, Thursday and Friday, August 8, 9 and 10, was held the second annual convention of the National Association. President Edwin L. Seabrook had canvassed the country for information, which was incorporated in an excellent address, and thus thousands of tradesmen knew that an effort was being made to better the conditions in the trade. The Indianapolis Convention Committee spared no effort to convince the trade by the letters sent broadcast that a welcome awaited the sheet metal worker, and the result was that 186 seated themselves for the commemorative banquet and the special return railroad rates which were secured by certificate holders.

The report of the Joint Committee on Tin Plate, while not revolutionizing conditions, showed that the movement in the right direction had begun, and was received as valuable for its suggestions and conservatism. The idea that the time for constructive effort had been reached in the roofing plate question was slowly received by some, but finally prevailed, and it is safe to say that if the report is read frequently during the interim until the next convention more can report the use of better tin, the receipt of better prices and profits and the increase in demand for the tin roof. The provision for the appointment of a Special Committee on Legislation as the result of the paper on the subject and the resolutions adopted is one that the trade can study with advantage. The association is to be congratulated on the number and excellence of the papers presented, and it is to be regretted that there was not time for them to be fully discussed. The Indianapolis members extended a welcome with a cordial warmth that gave much pleasure to their guests. The convention was favored with a goodly attendance of ladies, and there is evidence that the number will increase with the growth of the association. A feature of the convention was the helpful interest of the manufacturers and jobbers, and the exhibition hall was by no means the least of the attractions.

Election of Officers.

Otto Goebel announced that George W. Battley, Norfolk, Va., had resigned from the board of trustees, leaving an unexpired term of two years to be filled. He then announced the following nominations, stating that E. W. Richards, formerly treasurer, was nominated to the trusteeship made vacant by Mr. Battley's resignation:

President, Edwin L. Seabrook, Camden, N. J.
First vice-president, Paul L. Biersach, Milwaukee, Wis.
Second vice-president, J. A. Pierpoint, Washington, D. C.
Third vice-president, Charles A. Gauss, Indianapolis, Ind.
Fourth vice-president, Al. Bourlier, Louisville, Ky.
Secretary, W. H. Barnard, Norfolk, Va.
Treasurer, G. W. Battley, Norfolk, Va.
Trustees, W. A. Gallaher, Wilmington, Del.; Thomas F. Black, Brooklyn, N. Y.; Robert Kain, Cleveland, Ohio; E. W. Richards, Philadelphia, Pa.

On motion one ballot was cast for the nominees, making the election unanimous.

The place of holding the next convention was left with the Board of Directors.

CABINET WORK FOR THE CARPENTER.

THE HALL.

By Paul D. Otter.

If comfort and generous proportion are in evidence at a glance as one enters at the front door, the impression is conveyed to the visitor that each room bears evidence of its purpose. There are some visitors one does not invite beyond the limits of the hall—the book agent, for instance—and before his departure an easy seat will be welcomed. Generally the hall seat or settle with its straight back and little depth of seat is extremely uncomfortable. This style has no doubt been followed without much reasoning, but now in these days of rockers and reclining chairs and hard work, the chair that invites you by its back fitting angle or curve is generally in demand.

The hall seat, as shown in Fig. 1 of the illustrations, while it has a high grade character is not an extremely difficult piece to make, as will be seen in the end view, Fig. 2. It might be placed in the frequent triangular wall space directly below the first landing, but this is merely a suggestion with no intention to be specifically followed, as such wall spaces vary greatly, but the leg and heavy rail feature may be embodied in a working drawing to fit individual requirements. The small end suggests a pleasing form to terminate the seat of indefinite length at the turn of the wall, or entrance to a door. This end where exposed to full view should have a good figure, well finished. The width of the rail on this and its continuation along the top is made by gluing on both sides of the center a mold of the shape shown, the top edge being worked down smooth as "one piece," having a slightly crowned shape. Where a large space in the hall is available even 19 or 20 inches is none too deep for the seat, instead of 16 inches, as indicated on the seat shape. The turn of the seat, however, into the corner makes up for an entire lack of the proper depth.

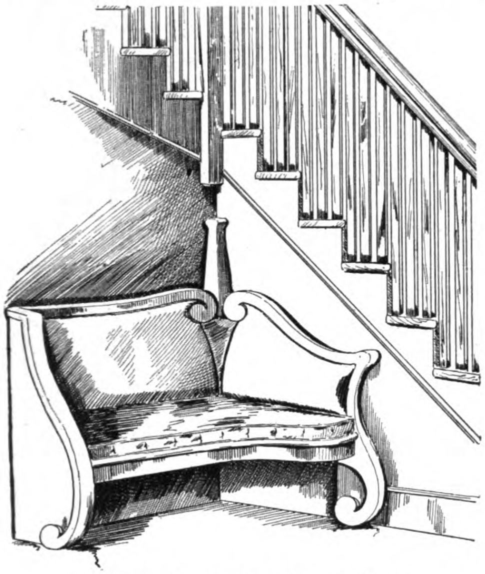


Fig. 1.—General View of the Hall Seat.

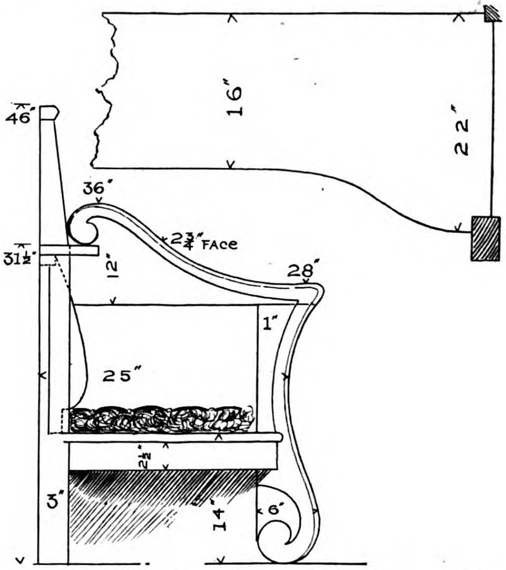


Fig. 2.—End View of the Hall Seat, Together with Partial Plan.

Cabinet Work for the Carpenter.—The Hall.

As indicated in the bulging line showing the proposed upholstering immediately over the seat cushion, a soft wood block of similar shape placed at frequent intervals will be necessary to falsely build out the overstuffed work into that conformity which is so comfortable to the back, and which few hall seats possess. A man familiar with upholstering or a carriage upholsterer should be given such work. The needs of the upholsterer are just as great for frames as would be the needs of the carpenter for the work of the upholsterer, so that the combining of forces is very frequently the result of a satisfactory furniture business. Much of the furniture of the present time is provided with upholstery, particularly of leather, giving it greater comfort and an air of sumptuousness. By closely observing the models about him a man skilled with tools may do very creditable work in a short time, and the suggestions given in the May issue of *Carpentry and Building* for 1902 and also in that of May, 1905, will be of benefit, the first dealing with spring cushion work, while the other has to do with the loose bag work so much in favor on types of mission work.

In Fig. 3 is presented a suggestion for a hall seat which can be made without cushions, although the wife may have something of that kind on it after it is finished. The main idea here is not so much originality of pattern, for it may be the ordinary hall seat or bunker, not much more than a high grade packing box in proportion, but a comfortable treatment may be given the back by making this into a neatly framed panel which, when not in use, may be pushed back as a part of the wainscot effect. When it is desired as a seat the lid of the bunker pulls forward to a stop, bringing with it the lower edge of paneled frame to an angle, which is more to be desired than a right angled position, small butts being used to allow of a loose joint. A trimming mold should be provided at the top as a detached apron, which will permit the frame to move slightly forward and down without showing the top edge. Illustration, Fig. 3, shows the idea sufficiently. When removing articles from the bunker raise the lid slightly, push back the frame in its regular position and then raise the lid to any angle desired. In the illustration A indicates the post to baluster rail, which would form an arm rest at the end of the seat in most hall arrangements.

Hall Frames.

Were it not for the expense mirrors should be used plentifully about the house. It would not be with the thought of vanity, but one of expansiveness, seeing double, as it were; and in the hall, and particularly the town house hall, or vestibule, this means of deception should be employed to apparently enlarge the rooms. Aside from the reflection the surface of a mirror, if

placed with some thought of catching light from some distant opening or window, has much to do in lighting what would otherwise be a dark room. For this reason the consol stand, dealt with in a previous paper, is a good piece of furniture in the reception hall. This brings the subject to a substitute for or possibly an adjunct to the consol—the hall frame—in which the mirrored surface plays an important part, or should play an important part, other than for trying on hats or arranging a necktie. The days for a little triangular or heartshaped patch of looking glass fixed in between some hooks are past, and the hooks of a smooth pattern are now somewhat on the outskirts of a large expanse of beveled mirror, the edge of which is cut to an easy line or a square.

The two extreme patterns of hall frames shown in Figs. 4 and 5 illustrate the character of prevalent styles, either a form having an easy outline with smooth surfaces and rounded off edges, or the more severe outline shown in Fig. 5, having a pronounced breaking away, however, from the straight lines and square corners of the Mission; the surface also is broken into by some simple perforations, as indicated.

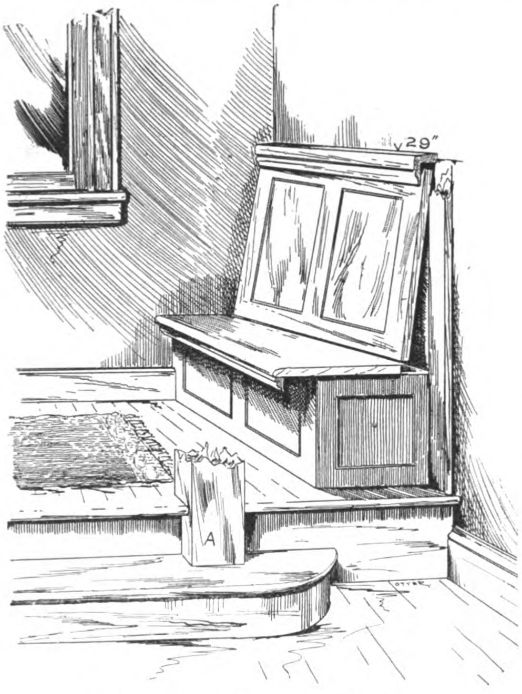


Fig. 3.—Another Style of Hall Seat.

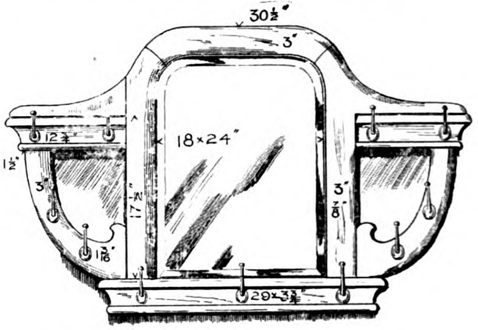


Fig. 4.—Hat and Coat Frame for the Hall.

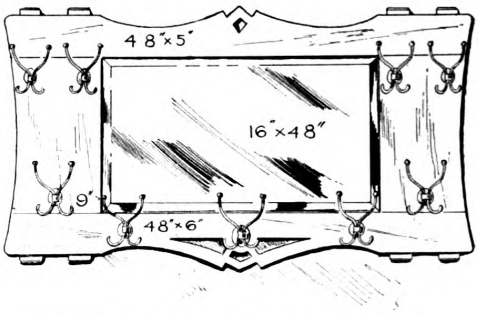


Fig. 5.—Another Style of Hall Hat and Coat Frame.

Cabinet Work for the Carpenter.—The Hall.

It is evident from the framing of Fig. 4 that in making the felloe joint, either the width of the stock of the three parts must be sufficiently wide to provide for cutting out the rounded corners on the inside, or the curve secured by building on by glue joint sufficient width in the rough to produce this curve. This joint may be accomplished either by a butt joint and dowels; or on the reverse of such a butt joint, the stock may be gained out, inserting a lapping piece, which will not show from the front.

The three horizontal hook molds will have to be worked out of stock 1½ x 3¾ inches into shape similar to that shown.

No attempt should be made to place the mirror in from the back into the usual rabbet, but fill the opening with thin backing, and prepare a small, neat quarter mold, which is tacked snugly into place after the mirror is set in the frame from the front. This is more expeditious in many ways than in preparing a rabbet.

The attractiveness of Fig. 5 depends largely on a judicious selection of figure in the wood. Were this made in the factory the honesty of purpose in the projected tenons might be questioned, as they are most frequently blocks glued on to make it look honest and "primitive," the bonding of the joint being by dowels. In this instance they happily are both a part of the construction and design and should be so treated.

Fireproof Flooring Made from Wood

The United States Consul-General at Berlin describes one of the wood pulp jointless flooring materials which are at present used in Germany. The one in question is known as "doloment," or stone wood, and is manufactured in Charlottenburg, near Berlin. Doloment is a plastic substance about the consistency of mortar, made of pulverized wood fibre, asbestos and a mineral substance, and colored by the admixture of various oxides to any desirable color tint.

The eight samples which were submitted as exhibits with the report show some of the shades in most common use—namely, terra cotta, gray, cream white and grained in imitation of red or blue veined marble. It is laid down in a smooth, even layer, ½ in. thick, upon the beton, or cement, substructure, which in German construction rests upon steel joists and forms the foundation of all floors, whether of wood, marble or other materials. The problem has been to make a continuous flooring which will cover the entire area of an ordinary room, fit closely at its junctions with upright walls, and be not only fireproof, but impervious to liquids, dust, vermin of all kinds, a poor conductor of heat and sound, easily cleaned, and withal neat and sightly in appearance.

All these requirements are said to have been successfully reached by the material which is now under consideration. On the beton substructure, and beneath the fireproof flooring, is laid an insulating layer of a composition composed of fine cork chips, asbestos, sawdust and some cohesive matrix to hold the other ingredients together, the principal purpose of this layer being to permit of expansion and contraction and some degree of settling of the building, without producing cracks in the doloment.

CENTERS FOR ARCHES OF DOUBLE CURVATURE.*—VIII.

BY CHARLES H. FOX.

IN the diagrams here presented we commence a series of explanations dealing with work of a practical nature, the problems introduced being for the most part copies of work already constructed. Rules will be given by means of which all necessary patterns and molds may be developed together with those for the construction of all bevels and at the same time we shall endeavor to give the necessary directions for forming the finished solids of the sash, &c., so that the student may, if he so desires, be enabled by the use of drawings of sufficient size to make models of each problem shown and thus obtain a thorough practical knowledge of the methods here presented. The problem now proposed for illustration is that of a circular sash in a circular wall with parallel stiles. The proper name for this problem is that of a cylindro cylindric sash.

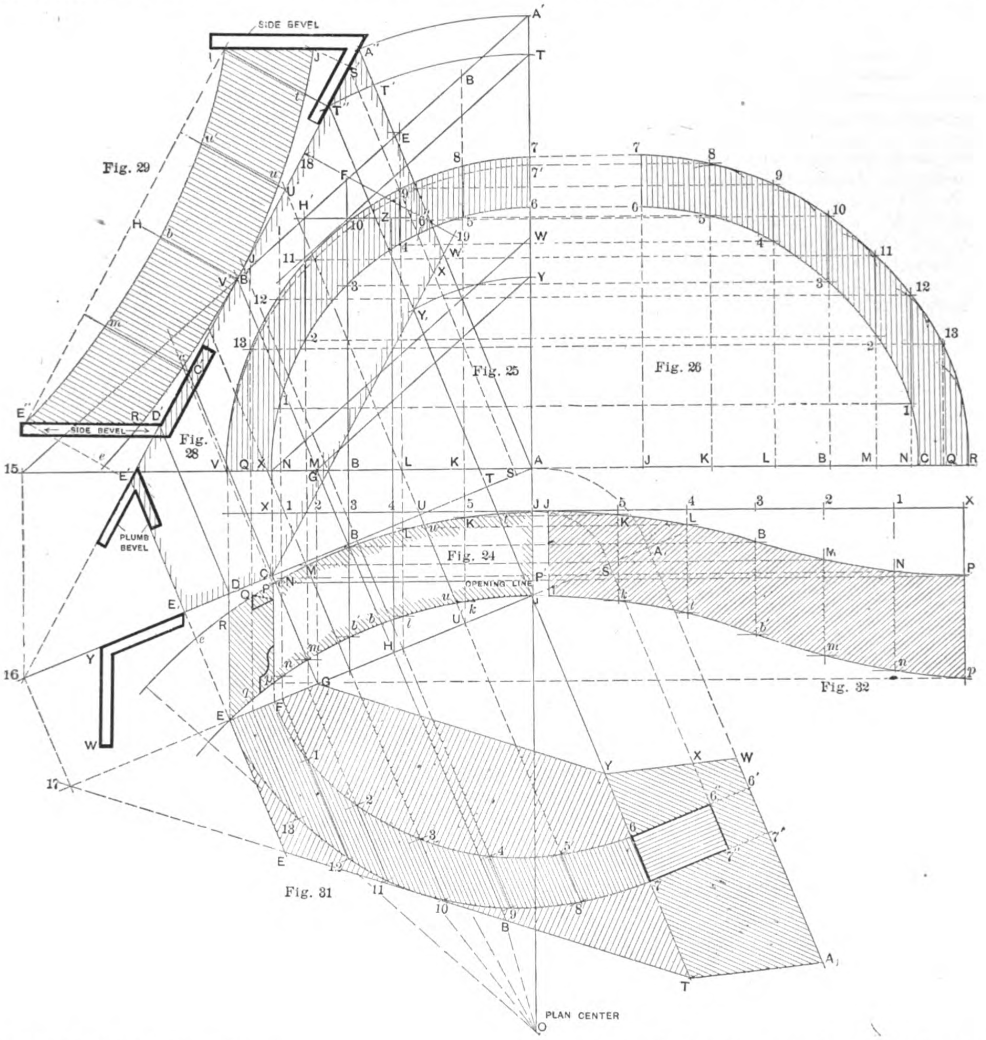


Fig. 24.—Plan of Half Rib of Sash.
Fig. 25.—Elevation of Half Rib of Sash.
Fig. 26.—Developed Falling Mold for "Convex Surface" or Outside Face.
Fig. 28.—Indicates Size and Thickness of Plank.
Fig. 29.—Developed Face Mold as Required at Top Surface of Plank, Together with "Side Bevels."
Fig. 31.—Rear Side of Plank with Developed Falling Mold Shown Applied.
Fig. 32.—Developed Falling Mold as Required at Soffit Surface.

Centers for Arches of Double Curvature.—VIII.

We have here assumed the sash to be in two pieces jointed in the center so that two planks are required, each of which contains a half rib of the head of the sash. It is hardly necessary to state that in the squaring up of the plank the molds are to be reversed in their application to either plank, as one forms the left and the other the right side of the sash; in other words the planks are to be "handed."

The half plan is given in Fig. 24, the convex curve being shown by J B R, while I *b* E represents the concave face curve. These are drawn with O as center. The half width of the opening is shown by P′ P, and the contour of the sash, both below and at the spring line, is given in P R E *p* of the plan. In Fig. 25 is shown the elevation A, indicating the center with which the curve X 3 C may be drawn. This is the representation of the soffit surface. To obtain the representation of the exterior bounding surface, we first develop the falling mold as required to give the direction for forming the rail, after the cylindrical surfaces of the face may have been worked; that is, if it is desirous of constructing a sash with parallel edges

---

* Copyright, 1906, by Charles H. Fox.

at the convex face. This is the proper manner of constructing the sash, although sometimes in the elevation A V is taken as a radius and the curve V 7' described, the falling mold being developed to the direction as given by the curve V 7'. As may be seen or found on trial, however, the length 6 7' will be found a great deal smaller than that of the length R P of the rib of the sash below. This may be satisfactory for a "near enough" job, but as at the present time we are not working one of this kind, we will explain the proper method.

To develop the falling mold as required at the convex face we proceed as follows, the principle involved in this development being that employed in the solution of the problem given in the intersection of two right cylinders. This principle was fully explained in connection with the diagrams shown in Figs. 13 to 17, therefore a repetition is unnecessary.

Referring now to Fig. 25, divide the soffit curve into any number of equal parts, as shown by X 1 2, &c. Then parallel with the center line O A, and from each point produce lines through the plan, as shown by 1 N *n*, 2 M *m*, &c. Now in Fig. 26 draw a line as J R, on which set off C N M B, &c., equal to the lengths of corresponding divisions in the plan curve; then square with J R through each point produce lines as shown. Now set off N 1, M 2, B 3, L 4, &c., equal to the lengths given on the corresponding lines of the elevations, Fig. 25. Through the points obtained trace a curve which will be the curve of intersection of the surface of the soffit with that of the convex face of the sash.

Now with the distance P R of Fig. 24 as radius and the points C, 1, 2, &c., of Fig. 26 as centers describe arcs, as shown. A curve may now be drawn to touch the arcs, which will give a falling mold with parallel edges. It follows that if the sash be formed to the direction of such a mold it will also be of a uniform width at the face. In order to render less difficult the development of the curve line V 11 7 of the elevation, a new vertical, Q 13, has been added to the number drawn in Fig. 26. The length C Q is transferred to that of P Q of the plan curve, and a new line, as Q Q' 13, parallel with the center line is drawn. This being understood, we next in Fig. 25 set off Q 13, N 12, M 11, &c., equal to the lengths of the corresponding lines in Fig. 26. A curve traced through the points thus obtained will complete the elevation.

Now on the plan draw I E to touch the extreme points as I E, which belong to the plan of the sash. Parallel with I E draw A E so as to inclose the plan. The width of the plank is now given in B H, and to obtain the thickness and length we first, parallel with the center line, draw H Z above. Square with the center line, and through a point as 10 on the vertical drawn from point B below, draw H' 10 Z. Square with A 10 draw 10 T. Now set off 10 H equal to 10 Z, and parallel with 10 T draw A' 15 and X W.

Referring now to Fig. 24, square with A E draw A A", I T T", D D' and E E, E'. Now in Fig. 28 make A A", D D" equal to A A' and V V' of Fig. 25. Draw A" D' and produce it, then parallel with it draw C W. The size required of the plank at the face is now given in C E, E' A", W C of Fig. 28.

In order to develop the side bevels we proceed as follows: In Fig. 29 square with A" E' draw T" I and E' E". With the points T" E' as centers and T I of Fig. 24 as radius, describe arcs in I and E", join A" I and D' E", and the side bevels may be developed.

The construction of the plumb bevels will be apparent on inspection of Fig. 28. As stated in an earlier issue in connection with the forming of the finished solid of the rail, we have the choice of two methods; that is, we may first form the soffit and exterior bounding surfaces and then to the direction given by molds as those shown in the diagrams Figs. 32 to 34 finish the working of the solid of the rail, or secondly, we may form the cylindrical surfaces of the convex and concave faces and then to the direction of the falling mold of Fig. 26 finish the solid of the rail. The resulting solid of the rail is the

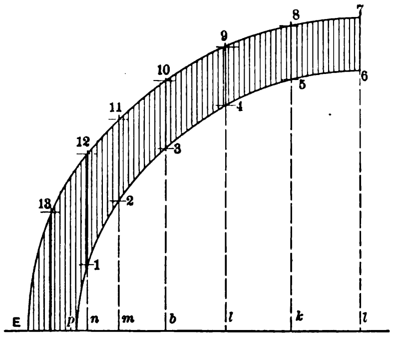


Fig. 27.—Development of Falling Mold as Required at Concave Surface of Plank.

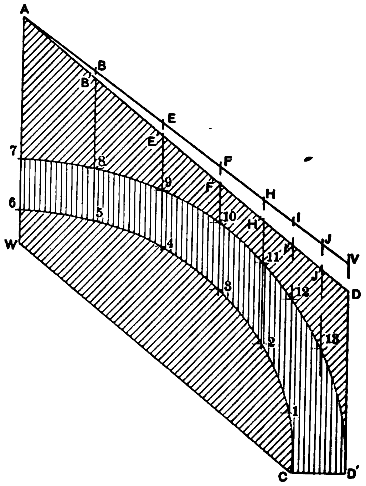


Fig. 30.—Outside Face of Plank, Showing Development of Falling Mold as Required at that Surface.

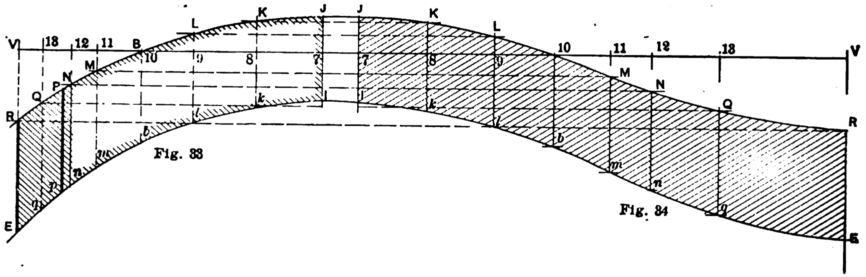


Fig. 33.—Plan of Fig. 24.

Fig. 34.—Developed Falling Mold as Required at Exterior Bounding Surface.

Centers for Arches of Double Curvature.—VIII.

same by either method. We will first explain the operation of the first named method.

In the construction of working patterns, or molds, and in the making of working drawings generally, it is very desirable that they should be constructed with as few lines as possible. There is a certain class of developments in connection with which it is almost impossible to get along without the use of a certain number of lines, especially as in the example now before us. We cannot in any instance form the finished rail without making use of molds which contain the development of the curve of double curvature of the intersection of the cylinders, and, as we have already explained, the greater the number of divisions made the more accurate will be the developed curves. At the same time, it is possible to construct or develop a number of separate diagrams, and yet only make use of the one set of projections; applying that portion of the projection to each diagram, as the necessity of the development demands. This, of course, may only be done by giving thought and attention to the matter, and it is for this purpose that we have mentioned the subject, for the young student will find that as he adds to his experience he will spend some little time in thinking out the best method of preparing his work at its very commencement and that as he progresses he will accomplish the same result by making use of half the number of lines that he made use of originally.

A practical illustration of what is meant is shown in the construction of the diagrams Figs. 30, 32 and 34. In A W C D D′ A of Fig. 30 is shown the outside face of the plank; that is, the side which stands over the line A D of the plan. This is a *fac-simile* of that shown in the corresponding diagram, Fig. 28, but in order to avoid confusion in the development of the curve lines, have employed a new plane of projection. This point understood, turn to Fig. 25 and produce the lines Q 13, 1 12, 2 11, &c., to meet the line A′ V′. In this operation we have, as it were, increased the hight of the auxiliary planes made use of in the development of the falling mold, &c., of Figs. 25 and 26. That is, their hight has been increased so that they now intersect the projection of the top surface of the plank as shown in the points A′ B E F, &c. Now take a strip of paper and transfer to one edge of the paper the divisions as given on the line A′ V′. Then in Fig. 30 produce the line D D′. Take the paper and place the point represented in A′ to the similar point of Fig. 30, and, keeping the point at A, move the paper until the point represented in V′ intersects the line drawn through D′ D.

The paper may now be fastened in this position, or, the divisions as that of A′ B E, &c., may be transferred to a line as A V. Having obtained the position of the points, parallel with A W draw B B′ 8 5, E E′ 9 4, &c.

In this operation we have projected in Fig. 30 the vertical traces of the auxiliary planes, in which they intersect the surface of the plank, which, considered geometrically, is a vertical plane, oblique with the vertical plane of projection. The traces of these planes, as we have already stated, at the vertical plane of projection are those represented in the lines A A′, K B, &c., of Fig. 25. This understood, in Fig. 30 make A 7 6, B′ 8 5, &c., equal to the length as given at the corresponding projections of Fig. 25, of course observing that C D is made equal to that of the corresponding length C D of the edge A D of the plan. Through the points given in C 1 2, &c., trace curves as shown; which give the face pattern at the faces of the plank as required in order to form the cylindrical surfaces of the soffit and exterior bounding surfaces of the rail.

In the diagram of Fig. 31, the pattern is shown applied to the inside face of the plank. The points given in E 6 determine its proper position. After the plank has been squared up to the direction of the side and plumb bevels, the point E will then be determined by the extreme point at the lower edge G E of the plank; the point 6 may be determined by making Y 6 equal to that of the corresponding length of Fig. 25. Or, having transferred the contour of the pattern as shown in Fig. 30, to the outer face of the plank, the lines as those of 6 6′, 7 7′ of Fig. 31 may be "squared" through the center joint surface, and the points as 6 7 of the inside face of plank be thus determined. This point will be clearly explained at the working of the rail piece.

After the cylindrical surfaces have been worked, other patterns are required, in order to give the proper direction for forming the vertical cylindrical surfaces of the face. The problem of this construction is again that of the development of the curve of double curvature of the intersection of the two cylinders, only here we have to develop the curve from or by means of the horizontal projections, instead of the vertical projections, as we did in the solution of the problems, Figs. 14 to 17. The geometrical principles which govern the projections to be now made are those which were made use of in the developments of the diagrams in question, so that their application here will be readily understood by the student.

First, we will develop what may be called "the soffit pattern." Its construction is shown in Fig. 32, and, as stated above, we shall again make use of the projections already given in the plan and elevation. In Fig. 32 draw any line as that shown in J X, on which set off J 5 4 3, &c., equal to the length of the arcs 6 5 4 3, &c., of the soffit curve of Fig. 25. Then square with J X, through each point draw lines indefinitely. Now in Fig. 24 square with the center line O A, draw J X. This line has intercepted the verticals *k* 8, *l* 9, &c., in the points 5 4, &c. In Fig. 32 set off J I, 5 K *k*, 4 L *l*, &c., equal to the length of the corresponding projections of Fig. 24. Through the points obtained in J K L, &c., trace curves, which will give the development of the curve of intersection of the cylindrical surface of the soffit, with that of the convex and concave faces of the rail. The pattern as required at the "exterior bounding surface," is shown in Fig. 34.

To avoid confusion of lines, we have transferred the plan, Fig. 24, to the corresponding diagram, Fig. 33; letters of reference correspond at both diagrams. In Fig. 34 draw any line as that of 7 V, on which set off 7 8 9 10, &c., equal to the length of the arcs as given in the corresponding projections of Fig. 25. Through the points obtained square with 7 V, draw lines indefinitely. Then in Fig. 34, square with the center line at a point as that of 7, draw 7 V. This has intercepted the projections already given at the plan, in the points 8 9 10, &c. In Fig. 34 set off J 7 I, K 8 *k*, L 9 *l*, &c., equal to that of the corresponding projections of Fig. 33. Tracing the curves through the points J K L, &c., as shown, and the development of the curve of intersection of the convex and concave surfaces with that of the exterior surface of the rail may be projected. Now construct the bevel, E Y W, of Fig. 24, by drawing Y W, parallel with the center line, and we are ready to start "squaring up the plank."

◆

San Francisco's Relief Fund for Building Purposes.

The chairman of the Lands and Building Committee of the San Francisco Relief and Red Cross Funds Corporation has, with the formal sanction of the latter, announced the intention of the committee in regard to building improvements for those who were burned out, or in advancing them cash for that purpose. The announcement of Chairman Thomas Magee involves four distinct propositions, aggregating $3,600,000.

One proposition sets aside $500,000 to be used in sums of $500, the latter being the amount to be given to the owner of a lot as a bonus toward paying for a new home. The sum of $2,500,000 is to be used to build cottages, two-story dwellings and flats. These are to be sold on the installment plan, or easy terms. The third proposition is to spend $100,000 for a home for aged and infirm people on the Almshouse tract. The fourth proposition involves the use of $500,000 in loans to owners or tenants for building purposes.

The loans and bonuses offered under these provisions are to remain open until October 1, 1906, unless the various appropriations are exhausted before this date. In the meantime the company will erect on the public squares numerous portable houses, in order that the entire population of the city may be housed before winter sets in.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

SEPTEMBER, 1906.

Improved Building Codes for Cities.

The great destruction of property resulting from the serious conflagrations recently occurring has caused steps to be taken looking to the adoption of means by which these losses may be eliminated or at least reduced to a minimum. The initiative in the matter has been taken by the National Fire Protection Association, which embraces in its membership practically every fire insurance company in the United States, and which is about urging the authorities in every large city in the country to pass ordinances for the adoption of an improved building code, based on rules laid down by the Fire Protection Association. The proposed ordinances require the introduction of automatic sprinklers with private water supplies in buildings in the so-called congested districts. The Association states that in spite of all the efforts of experts in fire protection facilities the fire waste in this country has continued uninterrupted and involves a larger per capita loss than in any other country. It asserts that the public protection has not kept pace with the growth of buildings and the increase in the valuations in the congested centers, and that the business prosperity of the country is liable to be checked if this increasing loss cannot be lessened by adopting improved methods of construction, by safeguarding hazards of occupancy, and by introducing automatic sprinklers and other private protection in addition to the public fire service.

Sanitation in Public Toilet Rooms.

One of the promising signs of the times has been the gradually increasing importance which is being placed on the arrangement and equipment of the public toilet room. It is, perhaps, the double result of the development of sanitary plumbing fixtures and specialties until the possibilities in this direction are matters of common knowledge and of the education of the rank and file of humanity with regard to the need for sanitation and its direct relation to the prevention of disease. The treatment these convenience stations receive in use is far from what it ought to be, but it is a long step from the unspeakable of not so long ago, and it would seem that the very character of the present day products, through their really attractive appearance on the one hand and their evidence of effort to prevent dirt lodgment on the other, inspire a respect that was formerly not the case. And one of the pleasing features of the late style toilet rooms is that, even where the campaign of education gives proof that it is hardly begun, frequent cleaning, with an actual deluge of water, if necessary, is a ready possibility. There are doubtless a number of details in the equipment of these rooms that might be discussed with the idea of bringing out some valuable opinions and experiences on the part of our readers. These the whole plumbing fraternity would be glad to have. As it is, one or two points suggest themselves in this connection. Recently—though this was not in a public station—an instance was noted where a group of three urinal stalls was provided in a space which should not have accommodated much more than two. The reasons why three were deemed necessary are not known at this writing, but there was no evidence that conditions demanded that number. Certain it is that when insufficient width is provided for the stall the fixtures get indifferent consideration, with the result that the room atmosphere will convince a blind person that here sanitation is unknown. This instance may be taken as a concrete illustration of the duty that the plumbing contractor owes to sanitation: while a desired maximum number of fixtures may be desirable, other things being equal, too great crowding through the use of all of them, as in the case described, should be strongly objected to, or, at least, strongly argued against. Then there is the closet or urinal pull for flushing purposes. This can easily be a source of danger, handled as it is by all manner of people. It is of course an absent detail where there is automatic means for flushing water, but in cities excessively scrupulous about favoring the products of some inventor automatic flush tanks are not allowed. In casting about for substitutes for the pull, one is apt to set upon some sort of attachment or contrivance in the floor, but which on second thought would most likely become a lodging place for dirt and germs. For closet flushing the seat action closet may be found satisfactory, while attachments in which the door to the stalls operates the flushing device do not appear to have the objections that pulls do, at least to the same extent. For urinal use it would seem that a flush controlled by a push button would be a step in the right direction.

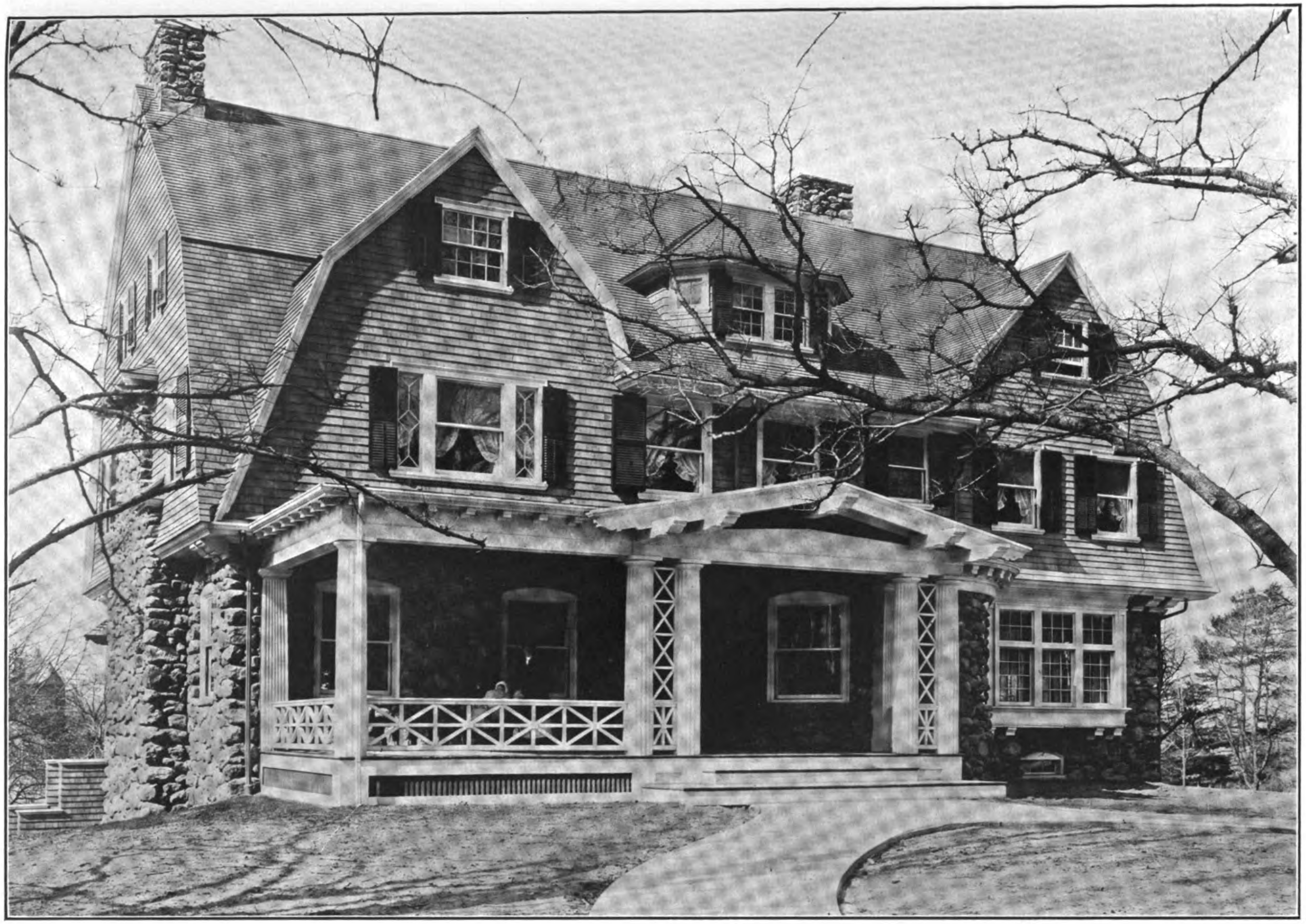
Some New Metropolitan Theaters.

In connection with the new theater which is to be erected upon the block bounded by Central Park West, Broadway and Sixty-second and Sixty-third streets, New York City, it may be stated that in form and purpose it will be unlike any place of amusement heretofore constructed in this country. It will be built through subscriptions by 46 founders with the intention not so much of earning profits as to foster a more worthy grade of drama than that generally produced upon the stage at the present day. The plans look to dramatic production on the most ample scale. The capacity of the house will be something like 3000 people and the stage will run to a depth of 75 ft. The design of the structure, which is that of Carrere & Hastings, of New York City, is classic in nature, with a low and rather inconspicuous ground floor with a surmounting colonnade of massive pillars spread across the entire face of the building. Many small doors in the front give admission to a large vestibule, in the design of which simplicity will dominate so that the chief effect may appear in the huge stone stairway leading above. At the top of this staircase will open a broad foyer, 150 ft. long and 30 ft. broad, which will be separated from the body of the theater by another long colonnade similar to that outside. Elevators will run up to the foyer and thence to the flat top of the structure, which is laid out in palm gardens, glass incased. In the basement will be a restaurant for the comfort of late diners. The amphitheater itself is so designed as to hold 46 boxes, which will be the individual property of the founders. The regular boxes, arranged in two tiers, will run around the rear of the parquet and communicate with it by passages, so that between the acts people may readily pass between the parquet and the boxes. Throughout the house the

VIEW IN LIBRARY IN RESIDENCE OF MR. R. G. HOWARD, WAVERLY AVENUE, NEWTON, MASS.

GAY & PROCTOR, ARCHITECTS

Supplement Carpentry and Building, September, 1906



STONE AND FRAME RESIDENCE OF MR. R. G. HOWARD, WAVERLY AVENUE, NEWTON, MASS.

GAY & PROCTOR, ARCHITECTS

Supplement Carpentry and Building, September, 1906

seats will be well spaced and roomy, so that the usual crowding and cramping incident to the general run of places of amusement will be obviated. It is exepected the building will cost in the neighborhood of $2,000,000 and be in complete working order in about two years. The first building of its kind to be erected in New York City since the revision of the laws governing the construction of theaters will be the structure on Forty-fourth street between Sixth and Seventh avenues, covering a site 88 x 101 ft. in size, though the plot has a frontage of 125 ft. and a depth of 100 ft. The building will be of Colonial design and will have on either side a 12-ft. alley with a number of exits. It will have a seating capacity of about 1500, and the first story and galleries will equal five ordinary stories in hight. The estimated cost is placed at about $300,000, and the plans are being prepared by Architect George Kiester, 11 West Twenty-ninth street, New York City.

School Heating Apparatus

Probably in no branch of mechanical work is there room for so much activity as in the improvement of the heating and ventilating apparatus of schoolhouses. It is commendable that several States have enacted laws providing a standard of ventilation. While this step will doubtless govern the character of the future equipment of new schools, it will also have an important influence on the remodeling of heating systems already in operation and needing repairs on account of the wear and tear of long service. Heating contractors are doubtless conversant with the heating equipment in the schools in their vicinity, and will not only be engaged in a commendable business enterprise, but will do a public service if they bring to the attention of the proper authorities the need of putting the heating plants in good working order and of making such improvements as will insure a frequent changing of the air as well as the maintenance of a comfortable temperature. In former times educational work of this character was discouraging, because there were so few precedents that were generally accepted to support those who engaged upon it. Now, with definite laws governing ventilation and conspicuous examples of accepted installations, there is the opportunity for endeavor and for support to make the educational campaign successful. The heating contractor will not only allow an excellent opportunity for good business to pass, but also neglect the duty of a good citizen, if he does not make some effort to see that schoolhouses in his territory have the faculty systems in them replaced, by arousing the authorities with respect to the shameful shortcomings of them. Local pride should be backed by permanent evidence of an appreciation of the importance of proper heating and ventilation in school buildings, recognized in other places by the compulsory legislation.

Builders' Wages in San Francisco.

We are in receipt of several letters from readers of the paper located in and about San Francisco calling attention to the article appearing in these columns last month relative to "Labor Unions and the New San Francisco." It is urged by some of the writers that the statement regarding wages of carpenters, bricklayers, &c., is misleading and unfair to the organized mechanics of the city. The point is made that the carpenter's minimum wage is $4 for eight hours' work, and that the District Council of Carpenters has on two separate occasions since the calamity voted down motions demanding an increase in wages. Owing, however, to numerous temporary buildings under construction, there has been a great demand for carpenters, and many of the first-class workmen are receiving $4.50 a day and a few as high as $5, the latter rate being paid for the finest bank fixtures and similar work, and is said to be only a temporary bonus offered by contractors to secure good men. At present there are said to be hundreds of laborers, clerks, &c., working at the trade side by side with union men, as the unions realize that if they are unable to fill the demand for mechanics they cannot in fairness to the contractors and to the public draw the line tightly as regards nonunion men. The wages of the bricklayers established by the union several years ago is given as $6 per day, but shortly after the earthquake and fire in April the wages were raised to $7 a day, while the plumbers who struck for an increase have been granted an advance of $1 a day, making their rate now $6. Several of the correspondents call attention to the great increase in the price of lumber, lime, cement, &c., as well as to the increase in the cost of living, pointing out that some slight advance in wages would under the circumstances seem fully warranted.

In regard to the comments appearing in our August issue, we desire to state that they were based upon information regarded as thoroughly trustworthy, and later in a measure confirmed by a report of a Government official touching the situation, and what we had to say was in no way intended as a reflection upon the building mechanics of the city or the unions of which they are members. The idea, rather, was to call attention to a condition of affairs which seemed to be tending to their disadvantage, and which if continued was calculated to bring about a situation offering little inducement to the outside investor, practically as set forth in the announcement presented by President P. H. McCarthy at the July meeting of the Building Trades Council of San Francisco.

Our Supplemental Plates.

We have taken for the basis of our supplemental plates this month a very attractive residence embodying in its exterior and interior treatment a number of features likely to interest architects and builders generally. It will be noted that the first story is constructed of field stone, giving a very rugged and picturesque effect, while the second story, as it may be termed, although largely contained in the lower section of the gambrel roof, is covered with shingles. The main entrance is a distinctive feature, and there are others calculated to appeal to the critical eye of the architect.

The interior view shows the library of the house, with its beamed ceiling and equipped with rustic fireplace of field stone, on either side of which are seats severely plain in finish, yet serving an admirable purpose. The residence illustrated is that of R. G. Howard, and is located on Waverly avenue, Newton, Mass. The drawings were prepared by Gay & Proctor, architects, 21 Bromfield street, Boston, Mass.

Convention of Builders' Exchanges.

At the Ohio State Association of Builders' Exchanges, held the latter part of July in Cincinnati, the following officers were elected for the ensuing year:

President, S. Rufus Jones of Dayton.

First Vice-President, John J. Purington of East Liverpool.

Second Vice-President, William R. Creer of Cleveland.

Secretary, Charles J. King of Massilon.

Treasurer, Leopold Kleybolte of Cincinnati.

It was decided to meet in Youngstown for the next annual convention.

Officers of Master House Painters' Association.

At the recent convention of the New York State Association of Master House Painters and Decorators, held in Saratoga, N. Y., the following officers were elected for the ensuing year:

President, John Little of New York.

First Vice-President, George H. Planz of Utica.

Second Vice-President, A. J. Weeks of Schenectady.

Secretary-Treasurer, Daniel L. Holland of Troy.

It was decided to hold the next meeting of the association at Elmira.

CORRESPONDENCE.

Adjustable Folding Drawing Board Stand.

From S. M. P., *Pinon, Colo.*—I send herewith a blue print of an adjustable folding drawing board stand, which I have lately made and find more convenient than any other I have seen. It is made of pine and the joints are dovetailed instead of being mortised. The hinges are sheet brass. The size of stand shown in the sketch will take a board 23 x 31 in. or larger, but it can be made to take a smaller board if desired. The top is adjustable from the horizontal to the vertical, and in hight measures from 26 to 38 in. to the lower edge of the board when in the vertical position. The shelf underneath can be drawn out to hold instruments, &c. The hooks on the legs hold them firmly in place so there is no falling down, and the space underneath is open for foot room. Referring to the sketches, Fig. 1 is a front view of the stand, showing its appearance when folded up and not in use. Fig. 2 is also a front view, but shows the stand open and the top raised. Fig. 3 is a plan of the main frame, Fig. 4 a plan of the slide, Fig. 5 an elevation of the raising frame and Fig. 6 a side view of stand with top raised.

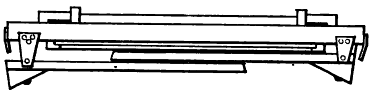


Fig. 1.—Front View of Stand When Folded.

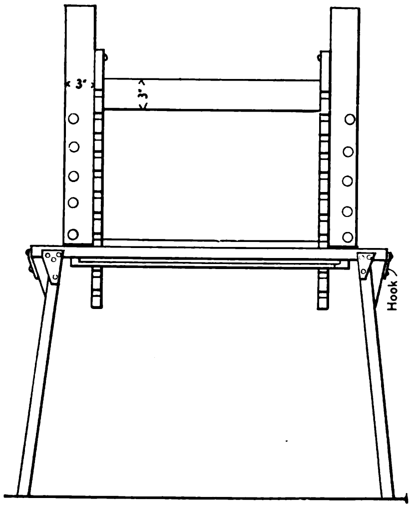


Fig. 2.—Front View of Stand Open and Top Raised.

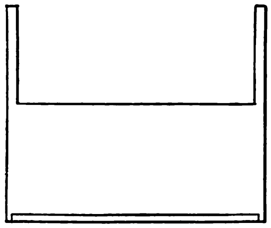


Fig. 4.—A Plan of the Slide.

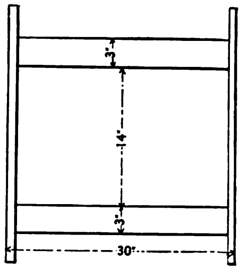


Fig. 5.—An Elevation of the Raising Frame.

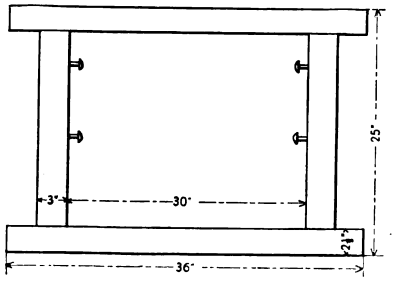


Fig. 3.—Plan of the Main Frame.

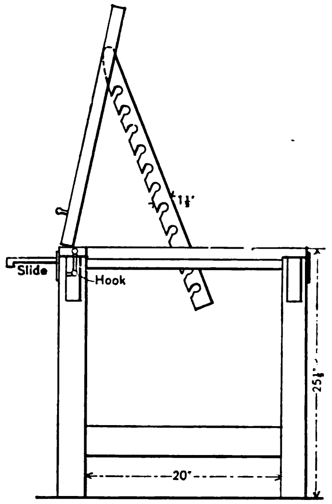


Fig. 6.—A Side View of Stand with Top Raised.

Adjustable Folding Drawing Board Stand.

Elements of the Segments of a Circle.

From H. N. S., *Shelby, Ohio.*—I would like some information regarding the elements of a circle. Within the last six years I have originated practical methods for finding the hight or spring of a segment of a circle, knowing the chord of the segment and the radius of the corresponding circle. Having the hight and chord of the segment I find the radius of the circle. Having the hight of the segment and radius I find the chord of the segment. I would like to know the best methods for the three preceding operations.

Answer.—To obtain the hight, or, as it is sometimes called, the rise or middle ordinate, half of the chord should be squared and this then subtracted from the square of the radius. Find the square root of the remainder and subtract it from the radius and the result will be the length of the required rise. This is an exact rule, but sometimes an approximate one is used which is as follows: The square of one-half of the chord is divided by twice the radius and the quotient is the result approximately.

To obtain the length of the radius when the rise and chord are known, to the square of one-half of the chord add the square of the rise and divide the sum by twice the rise. This quotient is then the length of the radius.

To find the length of the chord, either one of two methods are ordinarily used. The rise is subtracted from twice the radius and this remainder multiplied by the rise; the square root is then taken of this product and the root multiplied by 2; the result is the length of the required chord. The other method is to subtract from the square of the radius the square of the difference between the radius and the rise and then to take the square root of this difference, which multiplied by 2 gives the length of the chord.

Twist for Hand Rail at Top of Straight Flight of Stairs.

From C. J. M., *St. Johns, Newfoundland.*—In the July issue of the paper "Subscriber" asks for an easy way to obtain the twist of a hand rail for the head of a flight of stairs to connect with a level landing. I send here-

with drawings which I think will answer his purpose, and are so plain that they need very little explanation. Referring to the diagrams, Fig. 1 represents the rail in plan as it turns around the well. The triangle A B C is the pitch of the stairs. In Fig. 2 is shown the side of the piece of timber forming the joint at C in Fig. 1. The line G H in Fig. 2 is the center line of the rail at the joint marked for the plumb or riser of the pitchboard, while F is a point about midway between the width of the rail and the springing line of the circle A in Fig. 1, from which a level line is drawn to form the ramp. D and E show the pattern of the rail as it is to be drawn on the end of the piece and on the joint C in Fig. 1. The upper surface of the piece of timber is represented in Fig. 3, the curve shown being not a quarter of a circle, but the quarter of an ellipse, the semiminor axis of which is equal to A-C and the semimajor axis to A-B of Fig. 1.

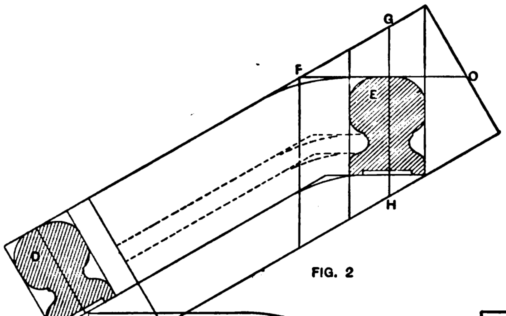


FIG. 2

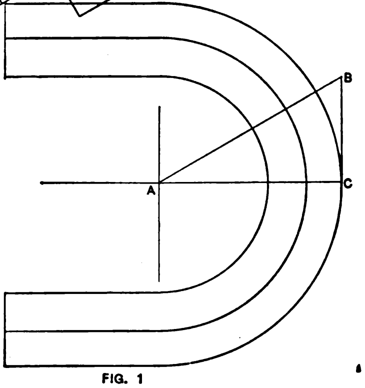


FIG. 1

Fig. 1.—Plan of Rail.

Fig. 2.—Side of Piece of Timber Forming Joint at C in Fig. 1.

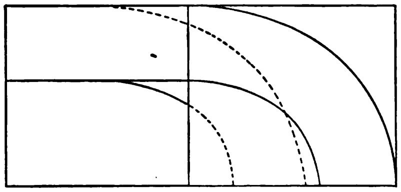


FIG. 3

Fig. 3.—Upper Surface of Piece of Timber.

Twist for Hand Rail at Top of Straight Flight of Stairs.

The other side of the wreath being only a level turn involves no difficulties.

The Molding Plane and the Carpenter's "Kit."

From C. J. M., *St. Johns, Newfoundland.*—I would like to ask my brother Chips if our old friend the molding plane, has been entirely banished from the carpenter's kit in these days of planing mills and machinery? Away back in the early '70s, when I first started in at the business, it used to be a part of the education of the apprentices to learn to keep molding planes in order and stick moldings. The man who could not do this properly and do a certain amount of such work in a day would not be called a carpenter. It was my experience a short time ago in repairing an old house to require 30 or 40 ft. of a certain kind of molding to match that used in the interior finish. The mills did not have that shape of molding in stock, so there was nothing for it but to stick it by hand. Now for surprise No. 1. Out of a crew of 15 young Chips not one of them had such a thing as a molding plane in his kit. I therefore produced the necessary plane, when occurred surprise No. 2. Not one of them knew how to take out the iron, rub it up and put it in again properly, let alone stick a molding with it, and all of these men were good mechanics, so far as their knowledge of the business went, but if it had not been for myself and another old fogy, sticking moldings by hand would have been a lost art as far as our crew was concerned.

Now, I dare say, others as well as myself have had a like experience, and I would say to all young Chips, do not let this part of the business drop, as some time you may be puzzled how to do the work. Get an old-fashioned Grecian ogee and practice during your spare time. If you find any trouble of which you do not know the cause, *inquire*, for you have no excuse for ignorance when there is such an admirable source of information as the Correspondence columns of *Carpentry and Building.*

Estimating Costs of Labor.

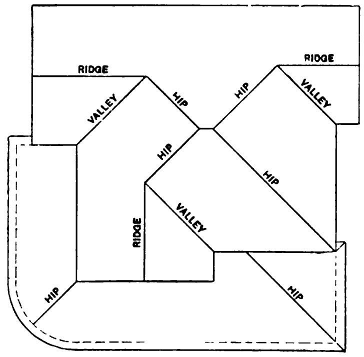
From A. E. C., *Vancouver, B. C.*—In the July number of *Carpentry and Building* I find the letter of "E. B. C.," Milwaukee, Wis., discussing the average day's work for a carpenter and his theory of estimating work; that is piece work. I am glad to see that he takes an interest in his trade by keeping track of the amount of work two men can do in a day, such as putting on cornices, &c., as no doubt his figures are entirely correct in comparison with the different sizes of cornices. I have been in the contracting business for a number of years and have tried the method described by "E. B. C.," but found it a failure in estimating work on a building, and would say that "E. B. C." may take the same two men with the very same size cornice on the same style of a house and he will find that the amount the men will accomplish will vary from the previous job, owing perhaps to slightly changed conditions of the present job, which may be in the position of the scaffolding, the class of material used and the length of it, the condition of the tools used by the men, the weather, which would influence the starting and stopping of the work and result in a loss of time, so that taking all things into consideration it is hard to strike an average that will be safe on which to base an estimate. I have found from practical experience that a young contractor will work four or five years at the business before he can properly figure the cost of labor on a building, and that is by referring to his time book and figuring up the cost of work on each house, comparing the new job upon which he is to figure with one of the jobs he has completed and adding to or subtracting from the results according to the conditions of the new job. In my opinion there is no system that will give more correct results than the time book. If wages have increased 5 per cent. then add 5 per cent., as I have found that labor is one of the most difficult matters for a new contractor to satisfactorily determine and it can only be done by experience, although it is a grand idea for a contractor to keep track of the different parts of work, such, for example, as the price per cubic foot, as it will help him to get at the cost of labor on large buildings in the construction of which he has not had much experience.

As to estimating from the time book by comparing the two jobs, I prefer the cubic foot system to the piece work in getting the cost of labor where one or the other has to be used. I keep track of the cost of each job, what

from some of the other readers on this subject, as perhaps they can make it plainer than I can do it. I thank Mr. Williams for his opinion, and for the detail which he has given in connection with the subject.

Roof Plan for "A. S. W."

From A. C. S., *Winchester, Ohio.*—I note the inquiry of "A. S. W.," Belmont, W. Va., in a late issue and inclose herewith a plan of roof which I trust may be of benefit to him. If I were called upon to erect the building in question this would be my method of treating the roof, the veranda to extend only one story in hight.



Roof Plan for "A. S. W."

What Material Is Best for Roof Covering?

From George P. Connor, *Boston, Mass.*—In answer to "W. T.," Richmond, Va., whose letter appears in the August issue of the paper, I would say that in my work I have used on several buildings under my charge a tar and gravel roof on top of concrete, and have had no trouble from it. The method I prefer is to first lay one thickness of heavy waterproof paper on the concrete and then proceed to lay the rest of the tar and gravel in the usual manner. In this way the roofing is entirely separate from the concrete, and any settling or cracking of the concrete will not affect the roofing, as each can expand and contract independently of the other. The weight of the roof is sufficient to hold it down flat as long as it is secured at the ends and sides, and each layer is well mopped. Frank E. Kidder advises in his book, if I do not misunderstand, to mop the first course directly to the concrete, and I understand that this method is generally used. I leave it to the readers of this paper to suit themselves when they are using tar and gravel on concrete.

In using tin I always get the best in the market, have it painted on the underside at the buildings so as to see that it is well done and that good paint is used and always place waterproof paper under it. If the outside is kept well painted and taken care of there will be no trouble with a tin roof under certain conditions; that is no chemicals, &c., being allowed to come in contact with it.

Cutting in a Threshold.

From W. V. K., *Westfield, Mass.*—I, with the rest of the chips, in this locality at least, have been very much interested in *Carpentry and Building*, especially in the correspondence columns. To "O. M. T." and "E. F. C." I would say, "Don't quarrel, boys; I think both of you are right, only one refers to weather boarding a cone and the other to a circular tower."

I used to be with "P. C. D.," Fryeburg, Maine, in his method of cutting in a threshold until I learned a better way, which is as follows: Place the threshold on the floor in front of the doorway in position to mark, one edge touching both jambs. Place a straight edge firmly across the jamb with one end projecting across the threshold. With a knife mark the threshold on this line, then with a measuring stick lay off on the threshold from this knife mark the distance between jambs. Place the straight edge across the other jamb in the same manner as before. Next move the threshold, if necessary, either way until the mark comes even with the line of the jamb. Mark with the knife again across the threshold side of the straight edge, then cut to the marks and you will have to cut but one threshold for that doorway.

Backing Hip Rafters.

From G. L. McM., *Tacoma, Wash.*—In regard to the request of "W. L. P." in the April issue for tables for the backing of hip rafters, &c., I desire to state that in my opinion tables are worse than useless, for they are never at hand when wanted, and the man who depends on them is helpless without them. The proper backing of hips can easily be obtained from the hips themselves after they are laid out. Simply square back from the plumb line half the thickness of the rafter. For example, in the sketch Fig. 1, let *a-b* represent the plumb cut at the top of the hip, then square across from *a* to *b* until the line *d-c* equals half the thickness of the hip (⅞ for a 2 x 6 sized or 1¾ in. hip) and a line drawn through *d* as indicated by the dotted line will give the proper backing.

For a bottom cut let *e-f-g* in Fig. 2 represent the cut on the bottom of the hip and *g-f-h* the plumb line. Then square back from *h* square with *h-g* until *h-i* equals half the hip as before, and a line through *i* as *k-l* will give the backing. This rule will apply to any hip regardless of the pitch, if the hip is the intersection at right angles of two roofs of equal pitch.

But why back the hip at all? Why not move the level cut *e-f* up so that a line plumb through *i* as indicated by the dotted line *m-n* will equal *h-f* and cut on the line *o-p* instead of *e-f*. This would drop the hip enough so that the top edge *x-y* would be in line with the top of the common rafters and save the time and labor spent in backing.

In regard to the side cuts of hips and valleys, let me suggest, if it's not too much like free advertising, that Nicholls Framing Square has the side cuts as well as all the other cuts for risers from 2 in. in 12 in. to 18 in. in 12 in., and I know of no more convenient place to have roof tables than on the side of the steel square.

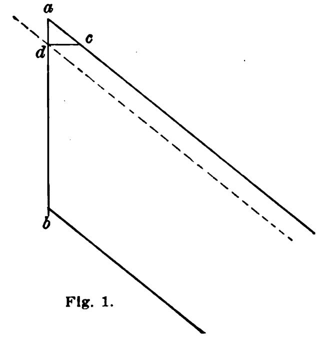


Fig. 1.

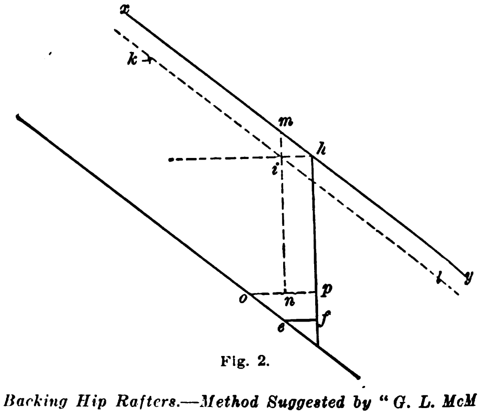


Fig. 2.

Backing Hip Rafters.—Method Suggested by "G. L. McM."

SHEET ZINC FOR ROOFS.

BY PHILIP JAHN.

AS there seems to be a revival of interest in the subject of sheet zinc for roofing, the following details relative to the use of the material in European countries may not be without suggestive value to many of the roofing readers of the paper. The information given was secured at first hand during a residence in Germany.

Sheet zinc was first used for roofing purposes in Germany about the year 1800, and it has continued in popularity and has given entire satisfaction ever since. It is estimated that, at the present time, 35 per cent. of the total output of the German zinc mines is used for this purpose. A roof made of No. 16 gauge zinc is guaranteed to last from 30 to 40 years without repair. Thus its value is obvious.

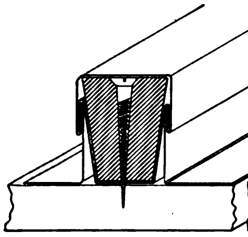


Fig. 1.—Belgian System.

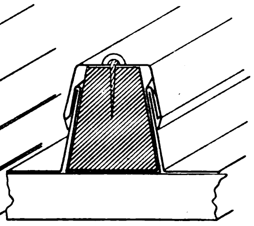


Fig. 2.—French System.

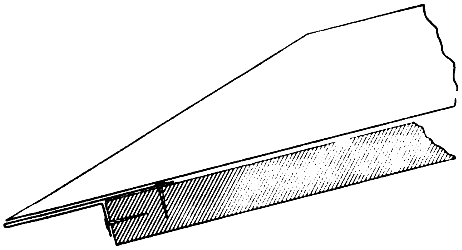


Fig. 5.—End of Wood Strip at Eave.

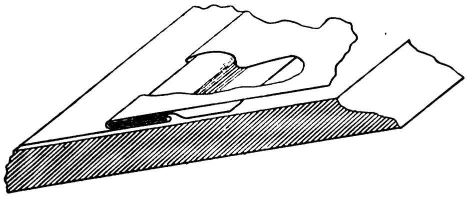


Fig. 7.—Broken View of Cross Seam, Showing Cleat.

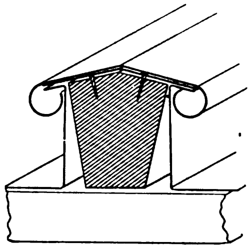


Fig. 3.—German System.

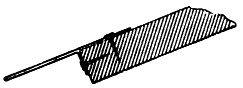


Fig. 4.—Eave Strip.

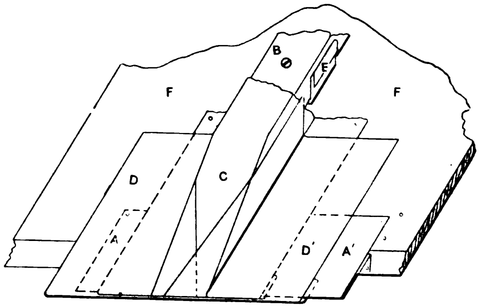


Fig. 6.—Finish at Eaves, Showing Metal Cap.

Sheet Zinc for Roofs as Applied in Europe.

Zinc is a metal that expands and contracts through climatic changes to a greater extent than any other known metal. If proper allowance is not made for this expansion and contraction, when constructing a roof, the zinc will buckle and bend, and finally tear, and the older it gets the more brittle is becomes.

The chemical action of zinc, it is well to note, is, under ordinary circumstances, similar to the oxidation of iron. Under the action of air and water, an oxide of zinc covers the material, which, however, can easily be brushed off in the early stages. In a few weeks' time, however, this oxide will become so settled that it cannot be brushed off. Even water will not affect it. It is this oxide that protects the zinc from all ordinary influences. This oxide, however, will not, of course, withstand the action of acids, such as are emitted from chimneys, nor of the salt air from the ocean. Lime, as used in mortar, and cement in concrete also have their influence upon zinc, especially upon new zinc. This, of course, refers only to fresh mortar and concrete. The chemical action in this process, while very slow, lasting nearly two years, is a sure one.

Soot that may lie on the zinc will form electric currents, if the same is wet through rain or moisture. These currents, no matter how weak, will act upon the oxide and seek the weakest spots in the sheets, so that holes will soon appear that have been eaten through the body of the zinc. The same result will happen if copper or iron comes in direct contact with the zinc. This is one reason why all cleats used on zinc roofs must be tinned. All iron work, too, that comes in contact with zinc should be galvanized or tinned.

Three different systems of zinc roofing are in use in Europe, known respectively as the Belgian, the French and the German systems. All have been in use a good many years, and they are, with a few minor variations, nearly identical in construction. Each kind has its own peculiar shape, but all strive for one point—allowance for expansion and contraction. In Fig. 1 is shown the Belgian system, which is the one we describe below. Figs. 2 and 3 represent, respectively, the French and German systems. In all three systems cleats are nailed to wood strips about 9 inches apart, before the strips are nailed to the roof.

As above stated, zinc is a metal that expands with the heat and contracts with the cold, and for this sufficient allowance must be made when the roof is being laid. A sheet of zinc 36 inches wide and 72 inches long will expand at least ⅛ inch in width, and nearly ¼ inch in length in hot weather. Nails should never be driven into the sheet. Nothing but cleats should be used to fasten the material to the roof. If nails are driven into the sheets, the heat will cause the zinc to buckle, and it will pull away from the nails, leaving a hole, which will cause a leak. This point, and that of expansion and contraction, must be carefully considered in laying a zinc roof. The action of the expansion and contraction is somewhat different on the Belgian system from that of the other systems. The zinc, in the Belgian system, moves into the bottom of the wood strips, whereas, in the French, it moves up the sides of the strips. In forming the edges of the sheets, care must

be taken always to get them as round as possible. If this is not done, the zinc, in a few years, will crack at these points.

To lay the roof an eave strip of iron is formed as shown in Fig. 4. In using sheets of zinc that are 36 inches wide, the wood strips must be 34½ inches from center to center. Before the wood strips are nailed to the roof, the cleats, as shown in Figs. 1, 2 and 3, must be nailed to the bottom of the strip. The lower end of the wood strip is cut off as shown in Fig. 5.

The wood strip is then nailed to the roof, and over the end of the wood strip is placed a metal cap, formed as shown in Fig. 6. This cap is nailed to the roof and not to the wood strip. If there are any valleys in the roof, 12 inches should be allowed on each side of the same and the strips be cut to this line. The same should be done at the eaves. The same shaped cap as is used at the eaves should be used at the valleys, and should hook into the seam of the valley, which should not be less than 1 inch wide. The wood strip at the ridges and hips can be made twice as large as the longitudinal strips. They can also be made of one size.

After the strips are all nailed to the roof, the same is ready to be covered with zinc. The cross seams are the first to be formed. These are formed as shown in Fig. 7, which gives a broken view of the cross seam, showing the cleat. After these seams are turned, the sides can be turned in this manner. Take a piece of leather or sheet lead and shove it in the cross seam, turning the sides up 1½ inches. Turning seams in this manner does away with soldering. After the sheet has been laid in its place, nail two cleats in the upper cross seam. As the sheets are laid in place, turn the cleats down over the sides. These cleats must all be of a uniform hight, so that when a cap is shoved over the ridge strip it will not be too loose.

The finish at the gable is indicated in Fig. 8. If there is a wall to be flashed that runs parallel with the wood strips, the same may be flashed in the usual manner. When a wood strip butts against a chimney or wall, however, flash as shown in Fig. 9. The sheets in this case are turned up from 4 to 6 inches against the wall, with the seams turned as shown, and the piece of zinc is shoved down over the wood strip. The cap is then placed over the wood strip and soldered. Fig. 10 shows the method in which this work is carried out, with a ridge strip and a common strip.

When the entire roof is laid and ready for the zinc caps, the bottom of each wood strip is already cut off in the manner shown in Fig. 5. The zinc sheets are then turned over the wood strips, as shown in Fig. 11. From this, it will be seen that it is necessary for the zinc cap that goes over the wood strip to be formed on a slant at the lower end, so as to cover the entire strip. In Fig. 11 A and A' are the eave strip, as shown in Fig. 4; B the wood strip, cut as shown in Fig. 5; C is the zinc cap; D and D' zinc sheets, with the ends turned over the zinc eave cap; E the copper cleats and F F the roof boards.

Gutters, such as are used with zinc roofs, are of numerous shapes and styles. In Fig. 12 is shown the construction of a false bottom zinc gutter, which is one of a type generally used. In this sketch, 1 is a band iron frame, 2 the sandstone cornice, 3 a running board, and 4 the gutter proper; 5 is the eave strip, 6 the cover for the running board, 7 a crown molding of zinc, and 8 a zinc strip that goes as far as B, to guard against condensation or leaks. There is not much need of going into details in describing these gutters, as the cut plainly shows the method of constructing them. If the gutter is very long, it is well to have expansion joints, so that the zinc can contract and expand at will. Fig. 13 shows the finished zinc roof, indicating the different sections.

In laying a zinc roof certain points should be kept in mind. In working zinc on cold days it is well to warm the metal to keep it from cracking. Cross seams are the only seams that are to be soldered, and then only when the roof has a pitch of less than 15 degrees. All cleats should be made of heavy copper and tinned thoroughly. Never drive nails into a sheet of zinc. Always see that there is room enough for the zinc to expand between

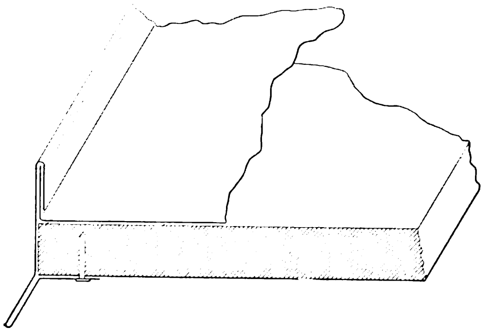


Fig. 8.—Finish at Gable.

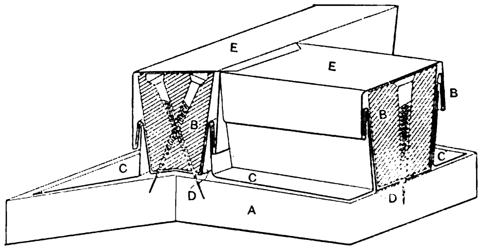


Fig. 10.—Showing Ridge Strip and Common Strip.

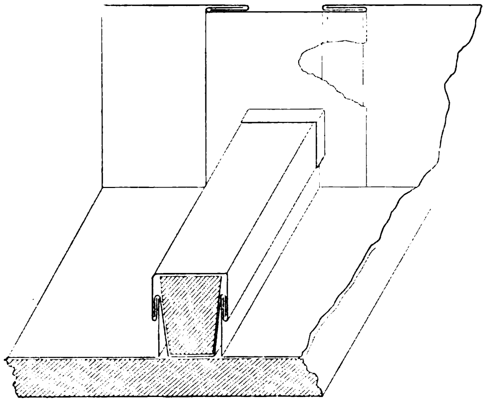


Fig. 9.—Wood Strip Butting Against Wall.

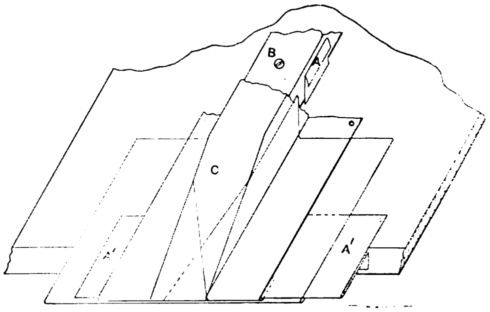


Fig. 11.—Showing General Construction of Zinc Roof.

Sheet Zinc for Roofs as Applied in Europe.

the wood strips. Never use a sharp instrument in marking the zinc, as this is liable to cause cracks. When cross seams are not soldered, they should never be hammered flat. The cross seam on the lower sheet should be at least ¼ inch wider than the cross seam of the upper sheet.

No. 14 and 16 gauges of sheet zinc are generally preferred for roofing purposes, and nothing lighter than No. 12 gauge is ever used.

Where zinc is exposed to chemical action, as referred to at the beginning of this article, it can be painted, but, before any painting is done, the zinc must have a rough surface, such as is caused by the oxide or made by mechanical means. A good time to paint zinc—probably the best time—is when the roof has a thorough coating of oxide. The paint then takes a good hold and will remain for some time. Zinc can be painted at once if it is desired, but, as before stated, it must be on a rough surface. The rough surface can be gotten by either sandpapering the roof or scrubbing it with sand. The latter method is preferable, because it is the easiest. This will cause a roughened surface, to which paint will readily adhere. It is better, however, to wait until the roof has its own coating of oxide. The paint will crack and peel off if the zinc has not this rough surface. Silicate of zinc is the best mineral paint that can be used for this purpose.

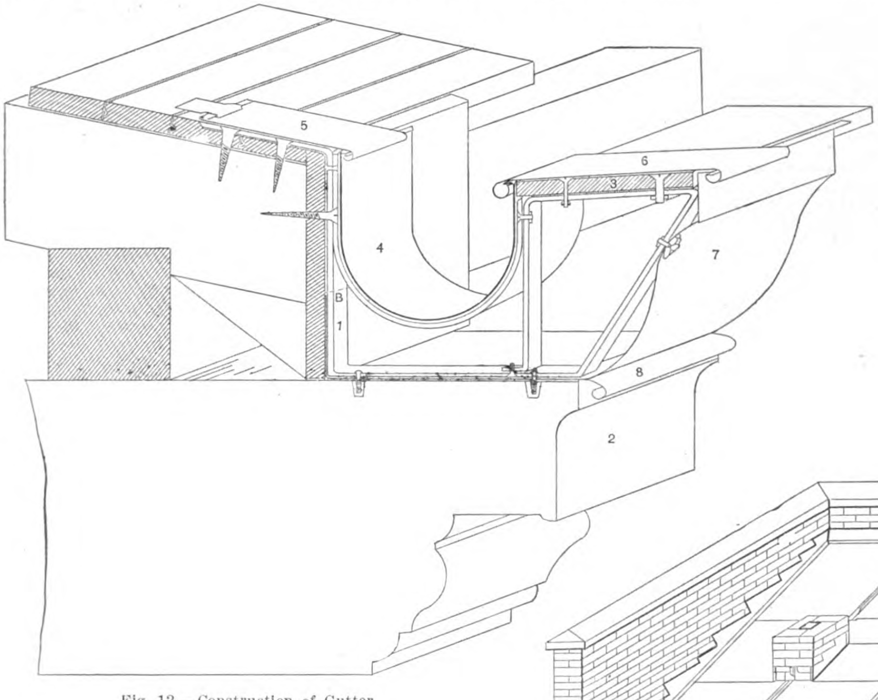


Fig. 12.—Construction of Gutter.

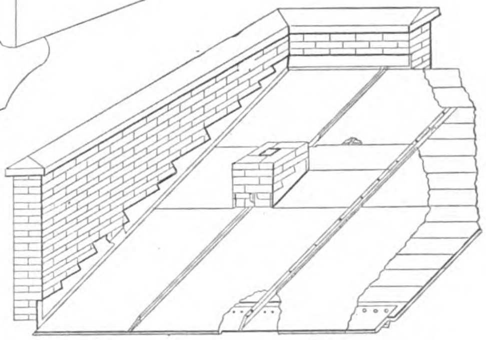


Fig. 13.—Finished Roof, Showing Different Sections.

Sheet Zinc for Roofs as Applied in Europe.

◆◆◆

The Labor Situation in San Francisco.

Estimates furnished by both contractors and labor organizations show that approximately 50 per cent. more laborers were engaged in reconstruction work on August 1 than were so employed on July 1. The following table is furnished by the Building Trades Council as giving the correct number of union men employed in the various building lines on January 1, 1906 and on August 1, 1906:

	January 1.	August 1.
Sheet metal workers	265	440
Carpenters	3,677	5,115
Bricklayers	350	500
Bridge and structural iron workers	200	360
Building material teamsters	350	775
Carpet mechanics	175	350
Casters and modelers	50	75
Cement workers	500	790
Elevator constructors	110	160
Electrical workers	650	1,070
Felt and composition roofers	85	250
Gas and electric fixture hangers	75	140
Granite cutters	50	75
House movers	70	160
Housesmiths and architectural iron workers	350	570
Hoisting engineers	80	110
Hod carriers	375	580
Lumber clerks	100	180
Stone cutters	50	140
Marble cutters and finishers	275	380
Tile layers	70	125
Millwrights	100	150
Millmen	1,225	1,520
Plumbers	450	525
Plasterers	400	600
Painters	1,650	2,000
Paint burners	17	40
Patent chimney builders	30	70
Slate and tile roofers	16	20
Sign painters	105	225
Steam pipe and boiler coverers	35	68
Glass workers	150	360
Shinglers	45	110
Stone sawyers	15	40
Varnishers and polishers	210	350
Window shade rollers	20	60
Laborers	900	2,000
Street railroad construction workers	...	1,200
Unclassified	...	8,177
Totals	13,319	30,000

◆◆◆

Shingles for Interior Decoration.

A new use has been found for shingles which is certainly a novelty and something which has not before been put into practice, so far as we are aware. All are familiar with their use on roofs, on gables or in place of siding, but to shingle the interior of a room, walls and ceilings, is something decidedly out of the ordinary. Yet this is what has been done in two rooms of a house in Bay City. The rooms are in the peak of the roof and the roof is, therefore, shingled on top and underneath. The shingles are cedar, which are proof against moths or vermin of any kind. The ceiling shingles are put on with the larger ends next to the walls and meeting in a point in the middle of the room.

WHAT BUILDERS ARE DOING.

REPORTS from various sections of the country indicate that building activity is well maintained, with the outlook in many instances for a year of record breaking figures. Most of the important cities show more work under way than a year ago at this season, the notable exception being New York, where in the Boroughs of Manhattan and the Bronx there has been a material contraction in the value of the building improvements under way. It is gratifying to note the generally peaceful situation which prevails in the labor world, and the steadily growing tendency toward a better understanding between employer and workman.

Chicago, Ill.

The record activity which characterized the building trade during the first half of this year was well maintained through July, when the cost of buildings for which permits were issued reached a greater total than since 1892. The aggregate cost of operations undertaken amounted to $4,849,960, as compared with $3,778,390 in the same month last year and $5,794,800 for the same period in 1892, the record year. During the first seven months permits were taken out for 7198 buildings, with a frontage of 164,891 ft. and a cost of $41,339,105, against 4419 buildings, 131,957 ft. frontage and a cost of $33,986,815 for the first seven months in 1905.

Prospective operations on the boards of architects are numerous, and the indications are that the fall months will compare favorably with the spring period. A scarcity of all kinds of material is delaying construction to some extent, but the higher costs which affect nearly all lines have not as yet deterred property holders from proceeding with improvements. Fair deliveries of structural steel are being made by the mills, notwithstanding the avalanche of orders which they receive from month to month. Quotations are also well maintained, no advances having been recorded in the last two years. Manufacturers of builders' hardware continue to defer deliveries, and contractors are being greatly delayed in the completion of a number of large structures owing to their inability to secure fittings either from jobbers or makers. The absence of labor troubles is noteworthy, as the building crafts have never before conducted affairs so peaceably as this year. The July record as compared with the like period in previous years follows:

	Number buildings.	Feet frontage.	Cost.
July, 1906	934	23,558	$4,849,960
July, 1905	768	18,869	3,778,390
July, 1904	623	16,298	3,765,000
July, 1903	548	15,724	3,191,790
July, 1902	570	15,703	3,322,480
July, 1901	547	15,308	3,165,390
July, 1900	346	9,807	2,108,800

The building figures for seven months since 1899 are given below:

	Number buildings.	Feet frontage.	Cost.
Seven months, 1906	6,198	164,891	$41,339,105
Seven months, 1905	4,419	131,957	33,986,815
Seven months, 1904	3,915	104,781	22,614,010
Seven months, 1903	3,502	98,184	20,210,050
Seven months, 1902	3,671	111,258	32,139,585
Seven months, 1901	3,692	103,531	20,945,355
Seven months, 1900	1,620	43,705	6,615,340

Lansing, Mich.

The amount of building which is in progress in and about the city is such as to keep all mechanics busily engaged, and contractors would be glad to add to their forces if competent men could be secured. Some contractors intimate that they are unable to secure enough help to complete their contracts on time, notwithstanding the fact that they keep advertisements running in the papers for more men. The amount of building in the city has not been equaled in years, and instead of diminishing as the season advances the prospects are that it will increase. Bricklayers and carpenters are in the most demand.

Lowell, Mass.

The builders of the city are right in the midst of a most active season, and are practically kept on the jump in order to meet the demands which are being made upon them. Hundreds of thousands of dollars are being expended on new structures and repairs, the improvements covering a wide range of work.

The Master Builders' Association held its annual outing in July at Nantasket Point. As soon as the party reached its destination arrangements were at once made for a game of baseball, the captains of the two teams being respectively Thomas Costello and William Farrell, the game going to the latter. Dinner was next on the programme, and after full justice had been done to the good things provided the sports of the afternoon were commenced. The 100-yd. dash was won by J. Whittet, with Peter Conaton a close second. The game of the afternoon was the bowling contest between the carpenters and the plumbers, the latter being the victors, because, as a local paper put it, they had Frank Weaver on their side. Mr. Welch left a record for Nantasket bowling alleys, his score being 277. Mr. Rabeour was the star bowler for the carpenters. The outing was a success in every way, and many of the party went later in the evening to Nantasket and Revere beaches.

Minneapolis, Minn.

Building operations for July were the third best month in the history of Minneapolis, with a total of $1,600,820 as the value of the improvements authorized. The record stands as the best month known in the city since May, 1889, when the permits for the present City Hall and Court House were taken out for $3,000,000. Although the actual number of permits issued was slightly less in July than for the corresponding period a year ago, the estimated value of the work is practically twice that of July, 1905, when 491 permits were issued, costing $881,975, as against 474 permits, costing $1,600,820, in July, 1906.

A tremendous impetus to local construction work has just been given by the *bona fide* announcement of J. Ogden Armour of the Armour Packing Company, Chicago, that his concern will at once begin the erection of a $10,000,000 packing plant in the New Brighton district. The independent plant that has been in operation at that point has already been absorbed by the big Chicago firm, and the purchase of about 500 acres of land in the vicinity has been consummated. At the present time negotiations are being carried on with the Minnesota Transfer Company and several of the railroads in northeast Minneapolis for trackage concessions, and local contractors and builders are being asked for figures on building and construction work. It is claimed that the packing company's intention is to begin work at once, in order to have the plant ready for occupancy early next spring.

A late building season is the probability for Minneapolis, owing to the inability of many of the builders and contractors to get material, especially in the iron and steel line. With not a cloud of labor trouble to darken the industrial horizon the chances are excellent for a continuance of the present building activity until the advent of cold weather, and a number of large structures will be begun between now and the time snow flies, with the express intention of keeping up the work during the winter.

New Orleans, La.

At a meeting held on the evening of July 26 in the rooms of the old exchange in Union street it was decided that "Contractors' and Dealers' Exchange" should be the name for the organization which will take the place of the Mechanics', Dealers' and Lumbermen's Exchange. The session was attended by a large and enthusiastic gathering, and the greatest interest was manifested in all matters which came up for consideration. James H. Aitken, president, called the meeting to order and briefly referred to the dissolution of the old exchange and the organization of the new one. He pointed out that it was the expressed intention of those who had subscribed to the shares of stock to make the new institution "a prominent factor in the field and bring it up to a high standard of usefulness and influence." The by-laws and constitution were then read and adopted, after which officers were elected for the ensuing year as follows:

President, James H. Aitken.
Vice-president, J. W. Van Meter.
Treasurer, George Abry.

The Board of Directors consists of Paul Andrey, Guy Stone, architects; J. W. Markel, builder; George M. Leahy, building materials; Julius Tschopik, representing Ahrens & Ott, general supplies; A. Weiblen, marble work contractor; Samuel Barnes, electrician; George Miller, factory; Herman Thomas, lumberman; H. W. Bond, plasterer; J. C. Maurer, painter; Charles J. Babst, paver; Joseph Weckerling, glazier; James W. Porch, foundry; George Glover, contractor; W. H. White, structural ironwork; T. L. Bixler, brick mason.

The Board of Directors have appointed a committee to select for purchase a suitable site upon which the exchange will erect its new building.

New York City.

Probably the most interesting feature of the building situation has been the decline in the price of brick, which brings it to the lowest figures in several years. While the fall in the price of North River hard brick is not considered an altogether extraordinary occurrence at this season of the year, the decline in comparison is greater than usual because it is necessary to consider it in relation to the extremely high prices which ruled earlier in the year. When, however, the figures are contrasted with the low prices of July, 1905, the concession is not so marked. At that time cargo rates at dock, New York City, were $6.50 to $7.25 per 1000. Under similar conditions of delivery brick have ruled the past month at from $5.50 to $6.25 per 1000, thus showing a difference of not more than $1 per 1000 less than the low price of last year. The opinion seems to prevail, however, that

the demand for brick will increase materially as the season advances, and better prices may be expected later on.

With brick at the low figure and in plentiful supply, it would seem that building operations would naturally be stimulated, but for the month of July the Boroughs of Manhattan and the Bronx show an appreciable contraction as compared with the same month last year, the estimated value of the improvements for which permits were issued being $11,439,550 and $21,453,460, respectively. Brooklyn, on the other hand, showed a slight increase in the new work projected as compared with July last year.

For the first seven months the value of the new buildings for which permits were issued in Manhattan and the Bronx closely approximate that involved for the corresponding period of 1905, the difference being less than $1,000,000. An interesting feature in connection with the figures is that while building in Manhattan increased materially over last year, the falling off in the Borough of the Bronx was just about sufficient to offset the increase. In Brooklyn the seven months' record shows a falling off of a trifle more than $3,000,000 in the value of the building improvements.

For the first six months of the current year the value of the new buildings for which permits were issued in the Borough of Manhattan was a trifle over $73,000,000, as compared with $58,400,000 in the same period last year, while in the Borough of the Bronx the figures were $15,850,000 and $19,475,000 respectively. These figures take no account of alterations and repairs, for which in the Boroughs of Manhattan and the Bronx $12,440,000 were expended, as against $8,627,000 in the first half of 1905. In the Borough of Brooklyn nearly 4000 permits were taken out the first half of this year for new buildings, estimated to cost $27,515,000, as against $28,670,000 in the same period a year ago. This shows that while the value of building improvements has increased in Manhattan there has been a slight falling off in the Boroughs of Brooklyn and the Bronx, where it may be stated operations were conducted upon an unusual scale last year.

Philadelphia, Pa.

Statistics compiled by the Bureau of Building Inspection show that the volume of new work for which permits were issued during July was greater than that for any previous corresponding month in the history of the bureau. Permits issued numbered 811 for 1528 operations at an estimated cost of $4,065,410, which exceeds the next best figures those of July, 1902, by over $50,000. The next best July was in 1896, when building work costing $3,041,568 was begun, while the past month exceeded that for the previous year by $1,275,255.

As has been the case since the beginning of the year, the preponderance of building work last month was in dwelling operations, and in this item the figures are far ahead of either last July, which up to the present time held the July dwelling record, or July of 1904.

During last month the permits were for 730 two-story houses, to cost $1,463,770; 48 three-story houses, $438,450; 8 four-story houses, $29,000, and 4 frame houses, $6900, as against 678 two-story houses, costing $1,243,540; 78 three-story houses, $299,080; 1 four-story house, $17,000, and 9 frame houses, $9450, in July of last year.

Other operations covering manufacturing plants, workshops, &c., also show a gain over the previous month, the most important operation being a number of buildings for the Baltimore & Ohio Railroad Company, which included an oil and storehouse, 40 x 105 ft.; a yardmaster's office, 30 x 60 ft.; a smith and machine shop, 60 x 254 ft.; a trainmen's and shipmen's building, 34 x 85 ft.; a roundhouse, 96 x 425 ft., and numerous smaller buildings to be erected at an estimated cost of $588,000.

The high prices and the scarcity of materials, which have been referred to from time to time in these columns, seems to have no great influence on the amount of work being done in dwelling houses, while on the other hand they have restricted to a considerable extent the amount of work which would have been done in other large improvements. In some cases the work has been deferred indefinitely, while in others plans have been revised to bring the work within the owners' expected expenditure.

It is generally conceded that a very much larger amount of building would have been started had prices of materials been somewhere within the range of what they were several years ago, or had the cost of labor not so materially increased; still it is difficult to see just how a very extensively increased business could have been well taken care of. Builders and contractors have been fully occupied, and the amount of work in the varying stages of construction is believed to be larger than at any previous time in the history of the trade. Manufacturers of materials and supplies entering into construction work are working at their utmost capacity, and the inability to furnish materials and supplies promptly continues and would no doubt be worse were the demand greater.

Labor is well occupied, and in almost every case is working in full harmony with employers. In some branches of the trade good mechanics are scarce, while the recent heated term has in instances seriously interfered with the production of a normal amount of work.

Prospects for the fall trade are considered exceedingly good, and some large operations are expected to be started. Contracts have already been signed for the erection of three large theaters, as well as for a number of other jobs, and a good volume of work is temporarily held up by the vacation season, which will no doubt have the attention of the trade early in September.

Rochester, N. Y.

The report of the Bureau of Buildings for the month of July shows that the total cost of improvements for which permits were issued is placed at $591,205, as compared with July last year, when the improvements were valued at $314,410. The new buildings for which permits were issued in July of the current year include four factories, a shoe warehouse, automobile garage, a railroad building, a church, schoolhouse, dairy and numerous private residences.

The members of the Builders' and Traders' Exchange held their annual outing at the Newport House August 9, President Frederick L. Heughes having previously appointed numerous committees to take charge of the affair. Members intending to participate in the outing reported to Secretary G. Henry Fisk. The transportation from headquarters to Glen Haven was by trolley, and from the latter point the members and guests went to Newport in launches.

St. Louis, Mo.

There is at present under way and projected an unusual number of business structures, such as office and hotel buildings, and it is safe to say that the volume of operations along these lines is without a parallel in the history of the city. This being the feature of the year's business, the market for dwellings and flats shows only a nominal increase over last year. The settlement of the bricklayers' strike removed a serious handicap to operations, as during its continuance there was a decided lull in activity in the outlying districts of the city. The high prices of building materials do not seem to have had any appreciable effect on the volume of operations. The month of June showed a very handsome increase, both in the number of the permits issued and the estimated value of improvements as compared with the same month a year ago, and the same may be said of July, when 876 permits were issued for buildings estimated to cost $3,358,779, as compared with 764 permits for improvements, estimated to cost $2,374,395, in July, 1905.

According to James A. Smith, Commissioner of Public Buildings, 4341 permits were issued for building improvements from January 1 to June 30, calling for an estimated outlay of $14,946,793, while in the first half of last year 3927 permits were taken out for buildings estimated to cost $12,320,195.

St. Paul, Minn.

Not only did July prove to be a better month than July last year in the amount of building work authorized by the St. Paul Building Inspector's Office, but the figures for the first seven months of the present year are likewise ahead of those for the same period last year. During July, 1905, there were 256 permits issued, at a total value of $456,910, and last month the number of permits was 263, with a total cost of $510,570.

Despite the fact that there has not thus far been a sign of labor trouble, the season as a whole is probably farther behind than in any previous year for some time back, due in large measure to the difficulty in getting iron and steel. At the present writing, says our local correspondent, this stringency is to a large extent passed, and the prospect is good for a wonderfully busy season from now until late in the fall. In fact, there seems to be every indication of another winter of heavy building activity that will equal if not surpass that of last winter. It is only within a few years that the local builders and construction men, taking their cue from the city departments, have come to see that it is not beyond the range of the possible to keep up building operations all the year round, notwithstanding the severity of the weather, and even now the most far sighted building and construction men in the city are confidently predicting the advent of a time within the next few years when the building season will be generally reckoned as 12 months in length instead of eight, as has been the case heretofore.

Three huge cathedrals, each of them costing $1,000,000 and upward, make up the principal items in the programme for purely building operations for the rest of the year. Plans for a Catholic cathedral, which have already been prepared by Architect Emanueal Hasqueray of New York, call for an imposing stone pile, to be located on the highest point on Summit avenue and to cost between $2,000,000 and $3,000,000. Within a few days a campaign has started for the erection of an Episcopal cathedral, to be erected in the so-called "hill district," at a cost of $1,500,000. No definite plans have as yet been made for the erection of the cathedral, further than the appointment of a Finance Committee to canvass for funds. The third of the $1,000,000 church edifices that will probably grace the "hill district" within the

next few years is the Lutheran cathedral, for which plans are now being prepared. With the purchase of a site in Minneapolis for the big Lutheran hospital, the decision in favor of St. Paul as the home of the cathedral is made out of consideration for the loyalty of St. Paul Lutherans to the hospital project.

Fort Snelling, midway between Minneapolis and St. Paul, is destined to be the scene of a remarkable run of building operations during the next year or more. According to present plans of the War Department buildings to cost in the aggregate between $2,000,000 and $3,000,000 are to be erected on the Reservation, and work on several of them will be begun at once. It is the intention of the War Department authorities to make the fort a "brigade post," and in order to do that the capacity of the present accommodations for officers and men alike will have to be doubled, and possibly trebled. The new buildings include riding halls, officers, non-commissioned officers, and enlisted men's quarters, warehouses, depots, &c.

San Francisco, Cal.

Our correspondent, writing under date of August 7, says: "The records of the Board of Public Works show that an aggregate of $2,925,529 worth of building contracts have been let since the great fire. A large portion of this was for temporary work undertaken before the new building laws went into effect, but approximately half of it represents more or less permanent work. During the month of July the actual contracts let were 132, the total sum represented being $1,282,506; and more than two-thirds of this amount represents permanent construction. Altogether, 470 building permits for work aggregating $3,514,000 were issued during the month just closed. This included seven permits for reinforced concrete buildings, to cost $210,000 and 56 permits for brick buildings, to cost $1,285,000. The remaining permits were for wooden buildings, foundations and alterations to damaged buildings.

"Contractors and builders estimate that there have been in the neighborhood of 2600 new structures built since the fire, and this agrees substantially with the report of the water company, which has made about that many new connections since its mains were repaired. No accurate count has been made of the buildings of cheap temporary construction which were put up after the fire and before the new building law went into effect, but it is supposed that there were between 700 and 800 of these buildings. This class of work has been entirely stopped, and no more wooden buildings are to be erected within the fire limits. Those already built are to remain during the pleasure of the city authorities, though it is understood that they will not be ordered removed for at least two years, and then only after 90 days' notice.

"An examination of the permits now being issued shows that the various forms of construction are about in the following proportion: Well constructed wooden buildings from one to four stories in hight, 60 per cent.; cheaper wooden structures, 10 per cent.; permanent brick buildings not in the A or B classes, 22 per cent., and buildings of the A and B classes (constructed of fireproofed materials throughout), 8 per cent.

"The work of cleaning out the damaged steel frame fireproof construction buildings which went through the fire is now well under way, and in some cases is already completed. In some cases it has been found that the fire damage was much heavier than was at first supposed. For example, the 14-story Merchants' Exchange Building had, according to the insurance adjusters, a fire damage of approximately $1,000,000. It is found that the brickwork is so badly damaged that more than half of it will have to be removed, and the management is preparing to spend between $600,000 and $700,000 in repairs. The brick walls of the Mills Building, another large steel frame office building, are also to be removed. Other buildings of modern type which are to be repaired at large cost are the Crocker Building, the Union Trust Building, the Telephone Company's three buildings, Wells, Fargo & Co. Building, Spring Valley Building, Shreve Building, Chronicle Building, Call Building, the Rialto Building, St. Francis Hotel and the Bullock & Jones Building. The repair work to be done on these building is roughly estimated at $2,500,000. The contract for the repair of the James Flood Building, which has already been let, calls for an expenditure of $87,000, and the contract for the tearing down and removing of the Palace Hotel walls will, it is estimated, call for an expenditure of $160,000."

Santa Monica, Cal.

The leading contractors and builders of Santa Monica have recently formed an organization to be known as the Master Builders' Association, with officers for the ensuing year as follows:

President, H. X. Goetz.
Vice-president, G. D. Snyder.
Secretary and treasurer, R. B. Yaple.

It is stated that the main object of the organization is to protect the owners, builders, contractors and material men from irresponsible bidders on work, as for some time past conditions at the Beach have been such that to obtain a contract it was necessary to take the work at a price which left little or no margin of profit.

Spokane, Wash.

Every architect in the city, says our correspondent, has all the work he can take care of, and bonuses are being paid to carpenters and brick masons, the last named receiving from 30 cents to $1 a day more than the regular union schedule. Those in touch with the situation are of the opinion that the season will be carried late into the fall and early winter. Probably the most important announcement of the month is that August Paulson will expend $750,000 in the remodeling of the Marion Block. The structure is to be 10 stories high and will have a frontage of 150 ft. on Riverside avenue and 100 ft. on Stevens street. J. K. Dow is preparing plans for the building, upon which work will begin in September.

Spokane is to have another hotel, to cost $50,000, the owners being J. M. Corbet and Walter Ogden. It will be three stories high, with full basement, and have a frontage of 80 ft. in Howard street and contain 100 rooms. A 10-ft. veranda will extend across the front of the building and will be walled in glass. Work has begun on the excavation, and the contract for the structure will be awarded early in August. The building is to be ready before the end of the year.

The First Presbyterian Church will erect a building to cost $75,000 next fall at Second avenue and Jefferson street.

John T. Huetter of Spokane has received a contract to erect a building to be occupied by the Lion Hotel at Lincoln avenue, between First and Railroad avenues, the structure to cost $40,000. The building will contain 80 rooms. The materials will be brick, stone and terra cotta, and the hotel is to be in operation by the middle of November.

Announcement is made that the Ross Automobile Company will erect a garage to cost $50,000. The American Fire Brick Company will erect a warehouse and office building to cost $30,000, the warehouse being in the shape of a triangle, 300 x 120 x 250 ft., while in addition many residences will be put up costing from $7500 upwards.

M. T. Hartson, postmaster of Spokane, has been advised by Supervising Architect Taylor of Washington, D. C., that contracts for the $500,000 Federal building to be erected in Spokane will probably not be awarded until next spring, and that work may not begin until June, 1907.

Notes.

The Master Builders' Association of Lynn, Mass., held its outing at the Anchor Club on Thursday, August 9, which proved to be a very enjoyable affair.

The rapid growth of the city of Evansville, Ind., with the constant demand for more residences and additions to various manufacturing plants rendered necessary by the increase of business, has given architects, builders and contractors an unusual amount of work this season. Some of the architectural firms report that they have never been so rushed as the present summer, not only on work in the city, but much that is outside of it. There is a great demand for building materials, and all signs point to a year of unusual prosperity in that particular line.

The members of the Master Builders' Association of Clinton, Mass., had their annual outing at Lake Whalom on Wednesday, July 11. More than 100 attended and the day was enjoyed to the fullest extent.

At the regular meeting of the Master Builders' Association of Atlantic City, N. J., held in the Bartlett Building August 3, an agreement was made with the Brotherhood of Carpenters and Joiners for one year, the provisions being as follows: The wages of journeymen to be 41 cents per hour for an eight-hour day; time and half time for work after hours during July, August, September, October and November, and the week to end Saturdays at noon. The agreement is to go into effect September 1.

The members of the Master Carpenters' Association of Newark, N. J., enjoyed their tenth annual outing at College Point, Long Island, N. Y., on July 20. The day was spent at Witzel's Grove, where on the arrival of the steamer a clambake was served, followed by a programme of sports, including a tug of war, several sprinting matches, a swimming contest and wrestling bouts, with prizes which were awarded to the successful contestants. The affair was in the hands of George Varley, president of the association, ably assisted by a committee consisting of Enos E. Harrison, Charles Schaedel, John Callan, Philip Gegenheimer, Albert L. Crowder and William G. Sharwell.

◆

THE trade school which is now being operated under the supervision of the Employers' and Builders' Association in Detroit, Mich., is to be greatly improved and enlarged, as a result of the formation of the Associated Employers of Detroit, organized for the purpose of running this school and at the same time to provide a permanent home for the associated employing interests of the city. In the new home there will be equipment for the thorough instruction of apprentices in various crafts they may elect to follow.

Drawing Grecian Curves.

The directions given for drawing the various forms of Grecian moldings which are shown contrasted with the cruder Roman moldings in that most excellent old book, "Principles of Architecture," by Peter Nicholson, constitute the basis of some interesting comments by a correspondent of an English building journal, who points out that the Roman moldings seem always to consist of curves which are parts of circles and can be struck by compasses, giving a very dull and lifeless appearance beside the subtle and refined Grecian curves. In regard to the matter he says:

Nicholson's methods of striking these curves, or rather of fixing a number of points in them, is ingenious, and I do not know if he has invented these methods, or copied them from some earlier author.

Fig. 1 is an example, and it will be seen that lines from A all pass through the equal divisions of the line B D: also that lines from F pass to equal divisions of B C. Where these two sets of radiating lines cross each other are points of the curve to be drawn. He makes this same principle apply to all the other Grecian moldings, but varying the positions of A and F, and also of the equally divided lines B D and B C, he gets a series of particularly graceful curves corresponding to the echinus, the cima-recta, the scotia, etc.

It occurred to me that an instrument could readily be contrived to facilitate the drawing of all these curves and which would serve for experimenting on all curves of the same genesis, such as those for the outlines of vases, cups and other ornaments.

In Fig. 2 let A B be a framework of the lazy tongs order, made of thin hard brass, such as used for printers' rules, and with the pins or rivets projecting along the line from B to D.

It is evident from the construction that these pins must always be at equidistant points, whether the lattice B D is wide open or tightly closed. Then let a second piece be provided, consisting of a fan shaped arrangement of thin brass rules as shown, with slots which engage with the pins on B D. The center of these rods at A has a sort of eyelet rivet which admits of a pin passing down to fix it to the drawing board (use an old board for this.) Ordinary drawing pins may be also passed through the holes at H H, making the lattice a fixture for the time being.

When the position of B D and the center A have been determined on, pencil lines are drawn through the slots of the radiating rods.

Then B D and A are fixed in any other predetermined position, more lines drawn along the slots, and where these lines cross the former ones will be points in the curve. It is obvious that more points may be obtained by using more rods and a longer lattice. The points can be joined by a line drawn by eye and hand, or they can be drawn in by means of the flexible spring rulers which can be had of the opticians and made for similar purposes.

This contrivance may serve for drawing experimental curves for the outlines of pottery, and for other purposes of the designer.

I must say a word for the clearness and beauty of Nicholson's illustrations. The drawings of the Grecian capitals seem to me never to have been surpassed, and are in striking contrast with the figures in modern encyclopædias.

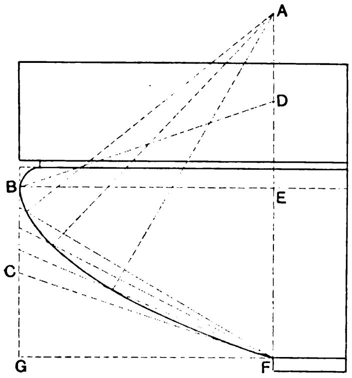


Fig 1.—Method of Striking the Grecian Curves.

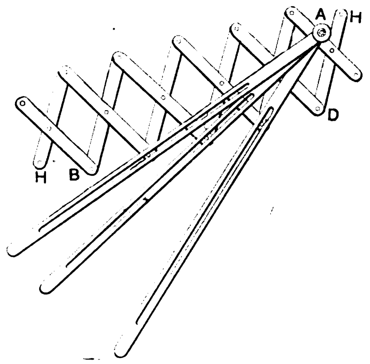


Fig. 2.—Instrument to Facilitate the Drawing of the Curves.

Drawing Grecian Curves.

◆ ◆ ◆

Wool Warehouse of Reinforced Cement.

A rather unique building, to be used as a wool warehouse, six stories high with basement and subbasement, V shaped, with a frontage of 289 ft. on Delaware avenue, 155 ft. on Walnut street, 128 ft. on Water street and 87 ft. on Gatzmer street, Philadelphia, Pa., is to be erected by Charles J. Webb & Co. of that city. The building will be entirely of reinforced concrete, interior and exterior, and all the beams, girders and structural parts, as well as the doors, window casings, window frames, and in fact all parts that are usually of wood, will be of pressed steel. The windows will be of wired glass. Even the foundations, which will extend for 28 to 30 ft. under ground, will be of sheet steel imbedded in concrete, and where necessary, sheet steel piling, filled with cement, will be used. The entire absence of wood in the construction of this building insures its complete proof from fire. While the cost is not definitely known, it is expected to be at least $500,000.

◆ ◆ ◆

The Perpendicular Style.

Towards the end of the fourteenth century a great change came over the architecture of this country. It began to decline, and this change first manifested itself, as indeed was likely, in the feature which more than any other was characteristic of all the styles—the window. The graceful, flowing lines of decorated tracery began gradually to lose their elegance and freedom, and to become more and more rigid and stiff. And this stiffness was not confined to windows, but soon spread over every detail, waving lines being exchanged whenever possible for perpendicular ones; hence the very appropriate name assigned to the style by Rickman—perpendicular. The date at which this came into general use, says an English writer, was the year 1377, or perhaps a little earlier. But, as was the case with the previous styles, the sign of transition—in this case the perpendicular line—had appeared some years before. The earliest instance known of a transitional church is the very remarkable one of Edington, in Wilts, which was consecrated in 1361. It was built by William de Edington, Bishop of Winchester, and some have supposed that his successor in that see, the famous William of Wykeham, taking the idea from Edington's innovations, invented the perpendicular style.

Whether this theory be true or not, this much at least is certain, that Wykeham was the greatest architect of his day, and that his own foundation of New College is the earliest pure building of the style. It was begun in 1380 and finished in 1386. But to return to the church of Edington. It is transitional throughout, not merely showing signs of a change here and there, but begun and finished within the period of transition; in general design and effect decorated, in detail a remarkable mixture of the two styles between which it stands midway. For instance, the west window, which is large and of eight lights, appears at a distance to contain decorated tracery, and the perpendicular lines are scarcely noticed though they occur at every opening. This is probably accounted for partly by the fact that not one of the mullions is carried up into the head of the window, and thus, the perpendicular lines being broken and scattered, the idea of perpendicularity is only imperfectly expressed. The doorway beneath exhibits a still more singular mixture of styles. The arch is segmental as in ordinary decorated work, but the upper part, forming a kind of tympanum over two doors, is filled with perpendicular paneling, and the whole is surmounted by a square hood molding, which is of very unusual occurrence in decorated work, though a similar example occurs in the north aisle of Dorchester Abbey Church. William de Edington began and Wykeham continued the alteration of Winchester Cathedral, and although the new works are, of course, in the perpendicular style, at least those of the former prelate are not wholly free from traces of the preceding style. In 1380, however, we find the new style thoroughly established and the flowing line of the decorated period utterly abandoned.

Building Methods in England.

By W. J. Blackmur.

The building trade of England is divided into sections, with many subdivisions, ranging from the firm that builds a cathedral to one that builds chicken houses, still the major part is devoted entirely to the building and rebuilding of houses for the mass of the English people. Now it is of this particular branch of the industry I wish to write and to describe the sort of houses mostly erected, and to tell of the various parts which constitute the modern villa or cottage. Although England may be perhaps the wealthiest country in the world, yet the mass of the people do not receive on an average more than $6 per week per family. I am referring principally to the working class—artisans, clerks and laborers—those who live in villas and cottages, the construction of which forms the major part of the building trade.

Before proceeding further it would be as well to clear the ground by saying that I intend to take the suburbs of London for the basis upon which rental, taxes and wages are fixed. This is necessary, as otherwise a wrong conception can easily be given, as at Bedford, not more than 50 miles from London, the trade union rate of wages is entirely different.

In London at the present time bricklayers are being paid 22 cents per hour, carpenters and joiners 21 to 24, while in Bedford the trade union rate is 13 cents and 14 cents per hour for the same class of labor. Such difference is but slightly recompensed by the house rent. In the suburbs of London a four or five roomed house would be from $2 to $3 per week, while in Bedford similar houses would be from $1.25 to $1.50 per week.

Living would be a trifle dearer in Bedford, clothing and other necessities bearing the same proportion, so this will show how futile it would be to generalize upon the building trade of England and give a correct idea of the wages paid without taking one district to form the comparison from.

The English Villa.

Since the advent of the Education Act of 1871 a desire for distinction has seized all classes, in some cases to a ridiculous degree. A builder of my acquaintance put up a street of four-roomed houses, which he let at $2 a week. Over the bay window of each house he let in a stone, and went to the expense of having this carved to suit the fancy of the incoming tenant. Still the tenant had only a limited choice, as he had to choose the name of a flower, and this was carved on the stone. It was interesting to watch strangers in the neighborhood read out the names of those villas as they passed them—Lily Villa, Daisy Villa, Rose Villa—and all houses which did not cost more than $800 to build!

The difference between an American and an English house is the open fireplaces, the absence of any wooden carcasing to keep out the cold, and the substitution of slates or tiles.

The old types of English houses did not have any front gardens, were built with the door opening onto the street, and with heavy wooden shutters to keep out burglars and other objectionable persons. Really, although it is getting away from the point, it is very interesting to notice the gradual evolution of the different types of houses now in existence in London.

To deal expressly with the shutters: These are of 1½ in. wood, made similar to doors, and painted two shades of green. They are now only to be found on houses which are at least 80 years old. The next period of development, and it shows that the times were improving, was the placing of the shutters within the room. The old ones required the window to be opened to bolt or fasten them; these others were let into a case, being hung similar to the sashes, and a lid over the case hid them from view. When they were required the lid would be thrown back and the heavy shutters pulled up, then a bolt inserted into a part where the top and bottom overlapped. The room was then safe and burglar proof at any rate. This protection eased the minds of maiden aunts and timid householders.

To-day there is not a single house being erected to be let at a weekly rental where there is any protection being made or used against burglars. Indeed, not only has the shutter disappeared both in and outside the house, but the small panes of glass have been displaced by one large one. The old window sashes would be divided into as many as eight divisions, with the proportionate amount of work of fitting and intersectioning the sash bars, a job which required considerable skill to perform to any degree of satisfaction. All London villas are brick built. The carcase is generally 14-in. brickwork, Flemish bond, the front doors being 2 in. and mostly glazed with cheap leaded lights. The roofs are slated, with the exception of the older houses, which have either tiles or pantiles. There is a difference between the two. The tiles are still being used, and in many cases are specified, as the red tints lend themselves to artistic effects, but the pantiles have been doomed for a long time, and it is only because they cover property which would be unroofed if they were taken away that they remain.

The pantile is a baked concoction of earth and clay. circular in the width, and with a projection at the top. This butts against a tile battern, ¾ x 1 in., and keeps the pantile in position. The bottom of the pantile covers the top of the lower one. To make such coverings wind and waterproof dabs of mortar are put where the top side of one pantile overlaps the other one. It need not be said that such roofs are distinctly ugly and unsuitable to modern civilization. Would the readers believe it, but we Britishers have so little pride in our city of London that the principal railroad approach from the Continent passes through a district with 80-year old houses and such pantile roofs. It is a sight not easily forgotten. The woodwork of the houses is of northern European growth. If the houses are built by a builder who wants big profits the joists will be of white fir, if built for ordinary profits, of yellow fir, with foreign made doors and moldings. The finish I will describe later.

It depends upon the neighborhood whether the house is with or without a cellar. If, as in many cases around London, good sand can be obtained for the digging and in some parts it is above the roadway, the builder digs a cellar and shifts his sand for ballast and fine.

The municipal authorities are exceedingly sharp in some districts about the quality of the mortar. A few years ago it was no uncommon thing for a row of unfinished houses to collapse through the wind pressure of only a moderate gale, owing to the absence of the sand. The common report at the time was that they sold

that commodity to the grocers to put into the sugar. However, much of this is stopped, and the builder to-day has to put sand and not earth with his lime to make mortar. Occasionally some of the builders will excavate the whole building plot, house space and garden, and sell the sand at from 60 to 80 cents per square yard.

The man who buys is the builder in a hurry to run up a lot of cheap houses. He will not wait to dig cellars, but simply removes the top soil until he comes to the hard gravel, then with about 18 x 6 in. of concrete for a foundation starts to build his houses. Generally this class of man will let out every class of work, brickwork to one man, carpentry to another, slating to some one else, and plastering, decorating, plumbing and whitewashing to separate individuals. By the time he has subdivided up the task of building those houses there is very little left for him to do, so if he has any money to spare he will tempt the manufacturers to give him bigger discount by paying spot cash.

The interior finish of the villas consist of two different varnished papers, the lower one darker than the other, with a dado to hide the joint between the two. The parlor has a large pattern paper, about 20 cents per piece; the kitchen an imitation of oak, and the bedrooms cheap paper with a small pattern. The cost of the paper is about 5 cents.

The ceilings now possess plaster cornices of simple design and center pieces in the parlor and best bedroom. The industry of making these plaster center pieces is in the hands of the Italians, who turn them out very rapidly and cheap from some little obscure shop in a slum.

No villa would be complete now without an electric bell and a bath. It is rather amusing to notice the various positions of the bath. In the best villas there is a room expressly devoted to the bath, and this also contains a hand basin, but in the smaller ones, where space is a consideration and the number of bedrooms the principal attraction, the bath is put into the scullery by the side of the copper in which the good housewife boils her clothes. It has a lid to it, so when not in use this is put down and the top can be used for innumerable purposes.

All the houses are now supplied with venetian blinds. They are supplied to the builder for 85 cents each. The latest attraction to catch the tenant's eye is to also supply cornice poles and gas or electric fittings.

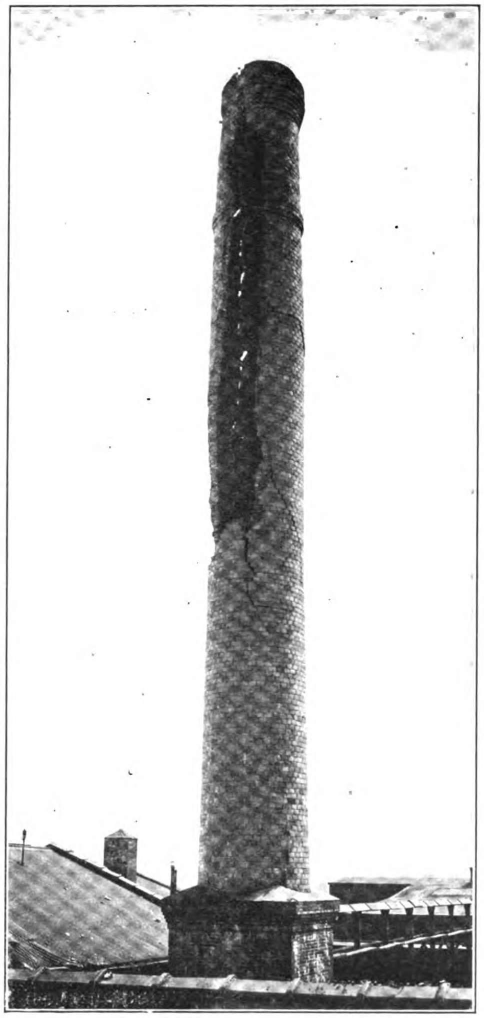
All these houses are built, and many are sold, on the instalment plan, some even changing hands for a deposit of $50, the balance being paid during a period of 20 years as rent.

◆

Lightning's Pranks with a Factory Chimney.

As if to appropriate to itself the credit of starting the celebration of Independence Day, a bolt of lightning struck the large stack of the manufacturing department of the Colwell Lead Company, Bayway Station, Elizabeth, N. J., formerly known as the American Sanitary Works, at 3 o'clock in the morning, demolishing a good part of it and putting the entire plant out of commission. While several high chimneys are struck every year, there are few instances on record where the lightning has done so much damage to a stack as it did to this one. As the plant is isolated, this chimney, which rises to a hight of 90 ft., stands out very prominently. It has a square base 25 ft. high, the remaining 65 ft. being circular in form. It is constructed of hollow brick, said to hold better than solid brick, and is capped with an iron ring.

On the side of the chimney toward the power house, to which it is attached, the bolt struck the iron ring, splitting it, and then tore away about a quarter of the circumference of the chimney from the top down to within 25 ft. of the base, leaving a jagged hole 40 ft. long. The lightning evidently ran down the inside, as in addition to producing large cracks, some of them wide enough to admit light, it glanced off and ripped away the inner half of the bricks covering an area of about 5 ft. square opposite and a little below the large hole, but leaving the outer half of the bricks intact. The destroyed stack is shown in the illustration herewith, which clearly pictures the large portion that was torn off. A couple of feet to the left of this hole there is a vertical crack about 1 in. wide, leaving between the two a narrow shell of brick, held apparently at the top by the iron cap and resting on a few bricks. From the top to the base are wide cracks every few feet running around the chimney. The base is practically uninjured, but part of one side of the roof of the power house was crushed in by the masses of brick that fell.



Lightning's Work on the Stack of the Colwell Lead Company, Elizabeth, N. J.

The chimney was reconstructed in record time. On July 9 the material for the new one arrived and in three days it was completely rebuilt. On Thursday of the same week steam was turned on and the plant placed in operation. The output includes enameled ironware and other plumbers' supplies.

◆

New Publication.

Wiring Handbook, with Complete Labor Saving Tables and Digest of Underwriters' Rules. By Cecil P. Poole. Size, 4½ x 8 in.: 85 pages, with 32 appended tables. Flexible leather binding. Published by the McGraw Publishing Company. Price, $1.00, post paid.

In the author's words this book is intended for the use of wiremen who have occasion to lay out their own work, and engineers who make up wiring plans and speci-

fications. This explains why the book contains rudimentary instructions and advice which the engineer will not need, and formulas that the practical wireman may not understand and will not ordinarily require. The greatest usefulness of the book will be found in the tables printed in the back on separate folded sheets, which may be spread out for convenient use. Once these are understood by reading the explanatory text pertaining to them the user has occasion to refer to them only. The tables deal with such considerations as the allowable number of lamps on a circuit; relation between drop, wire, size and load distance; capacities of standard sizes of wire; current required by motors, wire sizes for motors; power factors and inductance factors, resistance and reactance of copper wires; values of quantities in alternating current formulas; impendance drop for single, two and three phase motor circuits; busbar constants, and areas and perimeters of rectangular cross sections.

As with handbooks generally, it is not necessary for the individual to read from cover to cover. A reference here and there will supply the information needed. For example, at the beginning of the book is given a little on first principles in the part dealing with wiring terms and the measurement of feeders and mains. The other chapters as a whole are somewhat more elementary than the average person will require. A particularly useful part of the book is that containing a digest of the underwriters' rules applying to inside wiring.

◆

Heating and Ventilating the New Custom House.

One of the most complete heating and ventilating systems in the country is that installed in the new United States Custom House now under construction at Bowling Green in New York City. This is a large 7-story building occupying a lot 300 ft. long by an average of 240 ft. in width. With the exception of a small part an indirect heating system is used throughout. The corridors are heated by the special secondary utilization of the air after it has passed through the offices and rooms of the building and will thus serve, with the elevator shafts, as vent outlets for all rooms heated.

On account of the size of the building the heating and ventilating system was for convenience divided into four independent divisions, each serving a section of the building adjacent to one corner. Each division has an independent blower and duct system, together with air washing apparatus, tempering and heating coils and duct work. The blowers, of which there are four, furnished by the B. F. Sturtevant Company, Boston, Mass., are three-quarter housing, peripheral discharge, steel plate fans with 12-ft. wheels, 6 ft. wide. Each fan has a capacity of 100,000 cu. ft. of air per minute at 140 revolutions. The fans are belt driven by electric motors and deliver into ducts or cases measuring 6 x 7 ft. in cross section. The heating coils are controlled by thermostats. Very novel and interesting features are introduced in the way of spray chambers, tempering coils and reheaters, dry chambers and arrangements for avoiding back drafts to the rooms, &c.

◆

Death of Architect G. W. Cady.

In the death on August 9 of George Waterman Cady, the architectural profession of Providence, R. I., lost one of its best known veterans. He was born in the city named August 27, 1825, and was a direct descendant of Nicholas Cady, who settled in Watertown, Mass., in 1645. He was apprenticed in the carpenters' trade, but his natural artistic instinct led him to study architecture in his spare hours, and after a number of years he felt ready to go into business. He opened his office in Providence and for nearly half a century met with marked success. Among the buildings of the city designed by him may be mentioned the Barnaby Block, Infantry Hall; the Newman Hotel; the old Low's Opera House, a number of schoolhouses and many smaller buildings. He was a member of the Rhode Island Chapter of American Institute of Architects, and of the Providence Art Club.

A Concrete Office Building.

What is said to be the first structure of its kind to be built in New York City has just been projected for a plot fronting 126½ ft. on West Thirty-ninth street, and a depth of practically 99 ft. According to the plans which were recently filed by Radcliffe & Kelley, the architects, the structure will be 11 stories high with basement, sub-basement and cellar. The girders, beams and floor slabs will be reinforced with steel rods, and the angles in the building will be latticed together. The scientific design from which the plans were drawn was worked out by Prof. William H. Burr of Columbia University. It is intimated that the builders hope to save from 8 cents to 10 cents per cu. ft. over the cost of steel frame construction, the total outlay involved being given as $200,000.

◆

THE LAW TO PAY EMPLOYEES at least twice a month is valid, according to the Indiana Supreme Court. The court has decided that the penalty for delay in paying wages after demand, in no event to exceed twice the amount of wages due, is neither excessive nor oppressive. The law in question is that of 1887 relating to mining and manufacturing companies. The decision also declares that the payment of wages semimonthly is mandatory only when an employee makes a demand for his money twice a month, but that the statute in no manner requires the employees to exercise this right against his own volition.

CONTENTS.

PAINTED TIN
GALVANIZED TIN

THIS IS THE AGE OF THE

METAL SHINGLE

INFLAMMABLE WOOD SHINGLES, HEAVY SLATE, BRITTLE TILE
AND UNSIGHTLY PAPER OR TAR HAVE SEEN THEIR DAY.

And the reason is that the NEW CENTURY METAL SHINGLE is the natural evolution of the shingle question.

They are fire proof. They are light. They are unbreakable. They are artistic—and then beyond that are qualities of durability, strength, beauty and quick adjustment—all its own.

Note the appearance of just one building roofed with NEW CENTURY METAL SHINGLES and then compare it with the cheap, common kind done in wood, slate, paper or tar.

And then figure on this—that they're cheaper than wood, cheaper than anything when you figure all the saving points involved—insurance, protection, etc.

NEW CENTURY SHINGLES are handsome embossed design, the lock is simple easy, perfect.

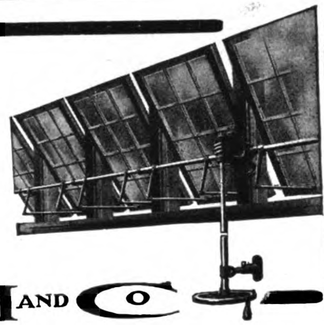
Don't fail to get the book, No. 25, we send you free, and post up on the roofing question, comparative costs, estimates, designs, etc. Address,

CHATTANOOGA ROOFING & FOUNDRY CO., Chattanooga, Tenn.

New York Office, 440 Greenwich Street.

H AND C

THERE'S PLENTY OF CHEAP SASH OPERATING APPARATUS



the kind that's made of light materials—the worms in the gear not machine cut—the bearings not finely adjusted. If you want a good thing to do a good job, you've got to pay for it. Ours is a good thing at the right price for a good thing.

HITCHINGS AND COMPANY,
GREENHOUSE DESIGNERS AND BUILDERS,
Manufacturers of Heating and Ventilating Apparatus.
1170 Broadway, - - - NEW YORK.

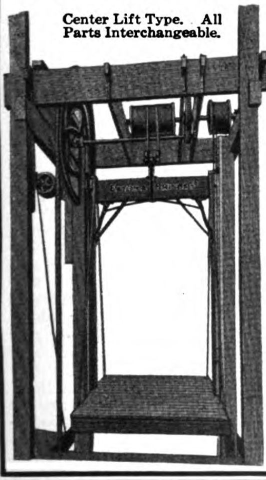
H AND C

When It Comes To

Hand Power Elevators

Use

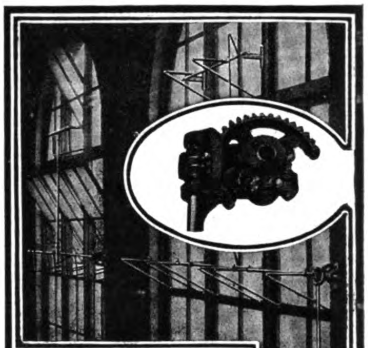
THE EATON & PRINCE



Center Lift Type. All Parts Interchangeable.

THEY are safe, economical, and easy to operate. Are the kind you seek and do not always find. Specify our elevators in your contracts and *please your customers*. You'll be interested in our booklet No. 50 on Safety Gates, Doors, etc. It will give you valuable information and is sent free for the asking.

EATON & PRINCE COMPANY
CHICAGO



Some Cranks in Sash Operation

Want you to go around all kinds of obstructions, down roof lines and such stunts with the operating rod, so they can shift the sash from some particular point in some particular way.

We are prepared for cranks.

Meet lots of their demands every day.

Fact is, we rather like cranks.

It gives us something to do—to do the other fellow.

Catalogue, XV Edition

Lord & Burnham Co.,
1133 Broadway, Cor. 26th St.
NEW YORK
Boston Branch, 819 Tremont Building

A BOOK FOR EVERY MECHANIC

The Workshop Companion.

A Collection of Useful and Reliable Recipes, Rules, Processes, Methods, Wrinkles and Practical Hints, for the Household and the Shop.

By JOHN PHIN.

164 pages, 12mo, neatly bound in cloth. PRICE, 50 CENTS, POSTPAID

DAVID WILLIAMS CO. - 14-16 Park Place, New York.

window, for which many large contracts have been executed, and there are now on hand orders to equip several large office buildings with this specialty. The head office of the company will be retained at the present location in Pittsburgh, with branches in New York City, Boston, Baltimore and Washington.

The Evans Crescent Expansion Bolt.

Novelties. — Crescent Expansion Bolts. — Fig. 7.—Driving Down the Parts Before Inserting the Bolt.

F. H. Evans, 596-614 Kent avenue, Brooklyn, N. Y., is putting on the market the double end grip expansion bolt shown in the accompanying cuts. A peculiarity of this two-part bolt is that it expands at both ends, while the pliable metal binds and grips, or secures itself into the sides of the hole. The lower piece, or one furthest from the head of the bolt, is tapped out to take the thread of the bolt. The upper piece is loose, and of just the proper size for the bolt to go through without friction. It is pointed out that there is no difficulty experienced in drawing work down closely with the bolts, and that it is only necessary to put the fittings in the hole in the usual manner, the nut piece being put in first, and then with a setting tool or piece of round iron or pipe and a hammer giving a sharp blow on the upper or loose jaw, driving it down hard on the lower or nut piece. This will open out the interlocking fingers on both pieces, causing them to grip or pinch at both ends and on all sides of the hole as shown in Fig. 7. The piece to be fastened is then placed in position and the bolt put in and screwed down hard. The work to be fastened will then be drawn down closely against the stone or brick. The interlocking fingers of the two pieces so engage each other that the bolt when inserted must take the thread on the first trial, and when it is screwed in hard the expanding fingers grip the hole at so many points that it is impossible to rock, shake or twist them out of position, as they practically bind on the entire circumference of the hole. All that is required is a hole of sufficient size and depth to insert the bolt with nut and loose jaw, when by turning the head, as with a lag screw or common wood screw, the nut piece is drawn toward the head of the bolt. This causes the interlocking fingers to be drawn together and outward over the beveled spaces on both the nut end and the free end. Any strain on the bolt only tends to further expand the jaws, so that the greater the tension the firmer the bolt will hold. A feature of the bolts is that they can be removed as easily as they are applied and without injury either to the articles fastened, or the bolts themselves. They are designed for use whenever it is not practicable or desirable to drill or bore through the material to which the fastenings are to be made, such as in bridgework, engine beds on masonry or solid rock, electrical work, iron window and door frames, railings, fire escapes, &c. Illustrated catalogues and samples screwed into blocks of wood or stone will be furnished by the manufacturer on application.

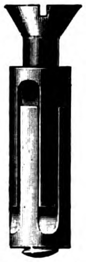


Fig. 8.—Parts Ready to Be Screwed Down.

Sash and Balance Chains.

A line of sash and balance chains comparatively new with the Diamond Chain Mfg. Company, Indianapolis, Ind., have been brought out and placed on the market. The line is complete as regards variety of sizes, and is made in brass, steel and copper. The cable or balancing chains are used extensively for sash chains, balancing counterweights on boring mills, planers, drill presses and the like, or for feed weights on special machinery. They are also used in chain oiling boxes and numerous places where wire cable or rope is not sufficient on account of operating over small pulleys. The manufacturer points out that the growing demand is for the small sizes for sash balances, it having been decided that the light sanitary type burns quickly in case of serious fire, while the cable chains will withstand greater heat. The company states that it has improved the quality of the material, and claims that Diamond Chains of this type are strong, neat in appearance and highly finished. A neat little pamphlet issued by the manufacturer shows the various styles turned out, and gives such information in regard to them as the trade will find of interest.

New Century Shingles.

An unusually attractive pamphlet, illustrated by means of numerous half-tone engravings, has just been issued under the above title by the Chattanooga Roofing & Foundry Company, Chattanooga, Tenn., and within its covers are set forth the merits of the shingles in question. Reference is made to the fact that the New Century is the result of years of practical experience and experiment by skilled mechanics "who are specialists in this line of work." Emphasis is laid upon the statement that the construction of the shingles combines "the desired features of economy, utility, artistic appearance and safety. These are all desirable qualities in all kinds of construction material, and are the leading features of New Century shingles." The shingle department of the company is illustrated by means of interior views showing the embossing, galvanizing and painting departments. The illustrations for the most part represent buildings of various kinds which have been covered with metal shingles turned out by the company. Among the closing pages is to be found more or less general information of interest to architects, builders, roofers, &c. A striking feature of the booklet, which is known as No. 25, is the treatment of the front cover, which carries a page representation of a New Century shingle, and which bears upon its face a facsimile of the company's trademark. Copies will be sent free on application.

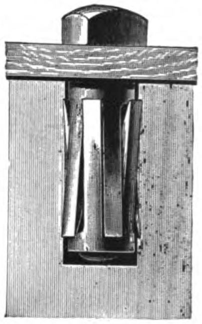


Fig. 9.—Expansion in Place and Gripping Sides of Hole.

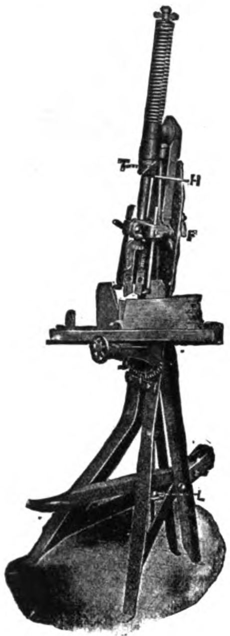
Bricklayer's Hammer.

The David Maydole Hammer Company, Norwich, N. Y., has just put a new pattern of bricklayers' hammer on the market, as shown in Fig. 10 of the cuts. It is made in four numbers, 561 to 564, inclusive, weighing, exclusive of handle, respectively, 2¼, 1⅞, 1⅜ and 1 pound. The hammer is of high grade material, with second growth hickory handle and adze eye, the main feature of this pattern being in the cutting end, which is straighter, so as to enable the workman to get in closer when working on a brick wall. The hammer proper is oil finished. Cased for shipment, they weigh per dozen 37½, 32½, 26½ and 22 pounds, in the order named above.

Fig. 10.—Maydole's Bricklayers' Hammer.

A New Tenoning Machine.

The Parks Ball Bearing Machine Company, Station A, Cincinnati, Ohio, has just placed upon the market a tenoning tool or machine which cannot fail to interest a large class among our readers. It is constructed under the personal supervision of the inventor, who is said to have placed the first tool of this kind on the market in the United States. It has a capacity for cutting a tenon 5 in. wide from one edge, or 10 in. wide by reversing and cutting from both edges. The bits serve the shoulder of the tenon with a sheering cut, severing the outside in advance to prevent tearing. The cutting edge also extends around the inside corner and shaves the side of the tenon smooth. Bits are adjustable right and left, and a scale is made to obtain the thicknesses of tenon ranging from ¼ in. to ¾ in. The stand is made of angle iron, strong and durable, the treadle and main frame being of wrought iron. The legs are heavily braced to sustain a powerful leverage. The machine will take in 12 in. between the guide bit and tenoning tool. The claim is made that it will make tenons very rapidly and with great precision. It has a tilting table with a patent adjustment for setting the tools square. As a mortising machine a valuable feature is found in the way the two middle collars are connected around the chisel shaft for setting the chisel square. The shaft is adjusted by turning the reverse handle H, shown in connection with the general view of the machine in Fig. 11 of the engravings, and then tightening the thumb screw F. The bed plate is always at the same hight, the adjustment for different widths of material being done from above. This feature admits of supports being made for either end of long work without building up to it every time the width is changed. The thumb screw F slides on an incline bearing so as to loosen it—does not drop out but lowers the mandrel and its parts gradually to the width of the stuff desired. The hand wheel in front of the machine moves the guide bed back and forth, the latter resting on a tilting device, which can be tilted to any desired angle, and adjustment for thickness can be made without changing the angle. A positive adjustment for the depth desired to cut is obtained by the screw wheel L, shown just beneath the treadle.



Novelties.—Fig. 11.—A New Tenoning Machine.

Universal Screen Door Catch.

The Universal screen door catch, shown in Fig. 12 as it appears when applied to a door, is made entirely of stamped wrought steel and has an automatic friction catch, with stop. The catch holds the door securely when closed, but a push from the inside or a pull from the outside releases the catch. When the sliding stop, seen in the center of the catch, is moved to the left it locks the catch, so that the door cannot be opened from either side while in that position. The latch bolt is so made that it has both a parallel and angular sliding motion. An important feature of this catch is the ease and rapidity with which it can be put on, without mortising for either catch or striker. It is made in old copper finish, put up in boxes of one dozen each, complete with screws, and in cases of five gross. The catch has just been placed on the market by the Peck, Stow & Wilcox Company, Cleveland, Ohio.

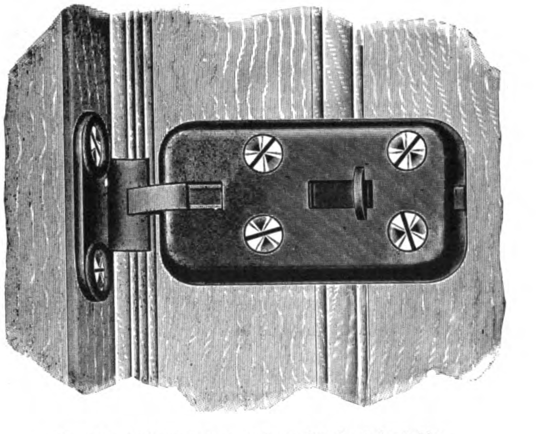


Fig. 12.—Universal Screen Door Catch, Actual Size.

The Anglegraph.

A device known as the Anglegraph and used as an aid in drawing is being offered by the Cassady-Fairbank Mfg. Company, 6106-6130 La Salle street, Chicago, Ill., and is illustrated in Fig. 13 of the cuts. It is made of light nickel plated steel, well finished, and is practically indestructible. In use a small nail or brad is driven through a drawing board from the under side, so that it projects about ¼ in. above the upper surface of the board. The drawing paper is centered and pressed down, so that the nail protrudes through the paper. The hole in the Anglegraph marked 1 is used as a center and placed over the nail, to obtain various results. The scope of the device varies from the most difficult mechanical drawing in higher mathematics to the simplest designs of kindergarten work. It adapts itself readily to all classes of university, school and college work and quickly accomplishes, it is explained, everything that is possible for the most costly instruments. It is pointed out that with the device any one can make and accurately divide circles into any desired number of parts or degrees, square a circle, make geometrical figures of unlimited shapes, and do the work in one-quarter of the time required by ordinary rule and compass. It is recommended for the use of architects, designers of wall paper, hardwood floors, mosaics, stained glass effects, &c.

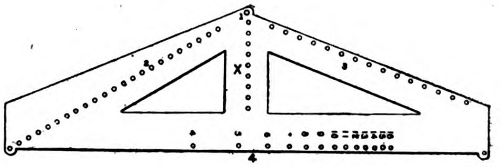


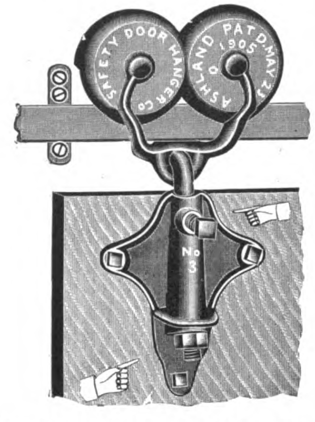
Fig. 13.—The Anglegraph.

Concrete Reinforcement.

The Expanded Metal & Corrugated Bar Company, 925 Frisco Building, St. Louis, Mo., has issued a catalogue of 232 pages, measuring 5 x 7 in. in size, and dealing particularly with corrugated bars for reinforcing concrete. The introduction treats interestingly of the theories and laws as at present understood to govern the performance of reinforced concrete, and the latest conclusions as to what constitutes good practice. Engravings follow showing the various sizes and forms of corrugated bars rolled, giving their net section and weight per foot. The body of the book is largely illustrated matter, consisting of details showing various systems of reinforcing for different parts and types of structures, and many half-tone engravings illustrate work in process of erection and after completion. Walls and floors of buildings, bridges, footings for columns and miscellaneous structures are also shown.

The Wizard Tandem Adjustable Hanger.

The Safety Door Hanger Company, Ashland, Ohio, is offering the tandem adjustable hanger, shown in Fig. 14, which has in addition both lateral and vertical adjustments. All difficulty of doors binding against the building is overcome by turning the set screw, and a door which drags at the bottom may be released by turning the hexagon nut. By means of the lateral adjustment the door may be placed as close to the building as desired, and both adjustments are easily accessible in case a roof is placed over the hangers and track. The hanger is guaranteed to run easy on account of the two sets of steel roller bearings, and the weight divided on two wheels instead of one, is designed to make the rail less liable to buckle. The frame and door plate are made of best grade malleable iron and the entire construction of the hanger is guaranteed by the maker to be stronger than the ordinary flexible design.



Novelties.—Fig. 14.—The Wizard Tandem Adjustable Hanger.

Catalogue of Architectural Sheet Metal Work.

We have received from the Willis Mfg. Company, 152 to 160 North Academy street, Galesburg, Ill., a copy of Catalogue No. 5, devoted to architectural sheet metal work, which is shown in great variety. The catalogue is oblong in shape, and consists of 112 pages, bound in colored paper covers. The frontispiece is an engraving of a portion of the company's works as they appeared in the spring of 1905, since which time important additions have been made to the plant. The purpose of the picture is to show a shipment of the company's No. 125 Willis Ventilators, which were used on a large boiler shop. The picture represents a flat car of the Atchison, Topeka & Santa Fe Railroad, on which are placed 10 of the ventilators in question. In the arrangement of the matter the early pages are given up to designs of sheet metal fronts for buildings, these being of a character to meet many requirements. There are also designs of bay windows, cornices, window and door caps, cresting, finials, gable ornaments, ventilators, hip shingles, &c., these being followed by a number of pages given up to metal ceilings, side walls, &c., in patterns corresponding to different styles of architecture. Other features of the work include the Willis fire doors, metal window frames and sash, under patents granted to W. H. Miller, awnings, tile roofing, conductor pipe, eave trough, statuary, ceiling centers, and sheet metal ornaments in great variety.

The Handy Saw.

George H. Bishop & Co., Lawrenceburg, Ind., are introducing to the trade the handy saw, illustrated in Fig. 15. The saw is really two saws in one, and is put on the market at a popular price. It serves equally well for panel, cabinet, small mitre and general household use. The handle is so constructed and attached to the blade as to allow it to be swung upon its pivot to one side or the other, and yet held firmly in its position for cross cutting or rip sawing. The blade is made of fine steel of sufficient stiffness for durability and is toothed on one edge for cross cutting and on the other side for rip sawing. The saws are made in six lengths, warranted, and are put up in cartons containing one-third of a dozen.

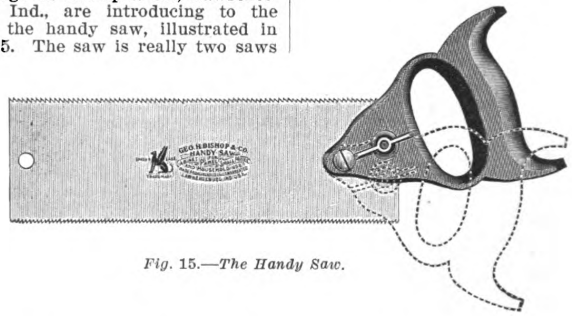


Fig. 15.—The Handy Saw.

The Geran Door Spring.

The door spring illustrated in Fig. 16, and offered by the Middletown Mfg. Company, Middletown, Ohio, has a cast arm working in a steel slide and operated by two oil tempered coil springs, the tension of which is regulated by a thumb screw in the arm slot. By setting the post close to the edge of the casing the leverage is increased, or placing it further back decreases it. The arm is 9 in. long, the steel slide ¾ in. by 8½ in., while the post occupies a space on the casing about 2 to 2½ in. The device weighs 15 oz. It holds a door open, half way open or closed. It is made in one size only, but is adjustable to any ordinary house or office door, and suitable for screen doors as well. The spring is finished in oxidized copper and is referred to as effective and ornamental.

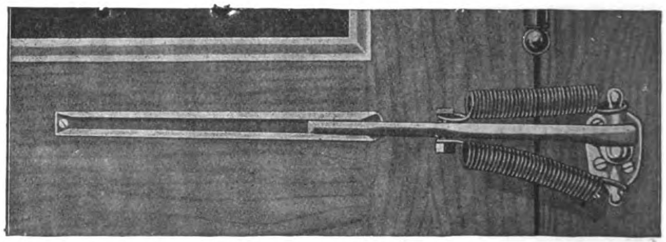


Fig. 16.—The Geran Door Spring.

Asbestos Protected Metal.

The Asbestos Protected Metal Company, Canton, Mass., is manufacturing a new product designed for use as roofing, siding and ceiling. It is composed of a body of annealed sheet steel, which is immersed at a very high temperature in a bath of cement compound of special formula. This compound is the result of eight years' continuous experiment on the part of a roofing expert and possesses unique preservative qualities. The intense heat of the sheet during the immersion tends to open the pores of the metal and allows a penetration of the compound. After this immersion takes place the sheet of steel is passed through a pair of steam heated dripping rolls, which removes the surplus compound and renders the coating even and clear. Pure asbestos felt is then applied to both sides of it under great pressure, and each sheet is afterward cooled slowly in a press, gradually contracting and hardening until its different component parts are united into a practically solid mass. The result is a material which it will be clearly seen can resist fire, water, gas, sulphur fumes and the ravages of the elements for an indefinite period. Asbestos protected metal possesses the strength, rigidity and lightness of iron roofing combined with the portability and ease of application of the most satisfactory ready prepared roofing. The manufacturer states that the means employed in constructing the material make it next to impossible to separate the asbestos from the steel by the for roofing or siding the liability to condensation on the inner surface, which is the most vulnerable point of an ordinary metal roof, is completely eliminated. It is produced in flat sheets 30 in. wide by 96 in. long, and 30 in. wide by 120 in. long, and in most vigorous scraping. When used corrugated sheets 27½ in. wide by 96 in. long and 27½ in. wide by 120 in. long. It is sold by the square of 108 sq. ft. and packed ready for shipment in crates with nails, cement and full instructions for applying. The flat sheets may be lapped or fastened with nails and cement in the manner in which an ordinary prepared roofing is applied, or they may also be laid with standing seam or self-locking seams, as in the manner of regular iron roofing. Two qualities are made—namely, Aspromet and Duckback brands.

Trade Notes.

The Bostrom-Brady Mfg. Company, Atlanta, Ga., manufacturer of Bostrom's improved farm and builders' levels, is removing its plant to the building on the corner of Madison avenue and Garnett street, where the company will have enlarged and improved facilities for manufacturing. An increased demand for the levels is reported from all parts of the United States and also from abroad.

Ornamental steel ceilings, iron roofing and siding and cornices are shown in great variety in a recent catalogue issued by the Duluth Corrugating & Roofing Company, Duluth, Minn. This catalogue, which is printed on heavy plate paper, comprises 128 pages, the greater part of which is devoted to illustrations of ceiling and side wall plates of sheet iron, together with border plates, moldings, beam stampings and center pieces. This company also makes a specialty of erecting complete galvanized iron cornices and shows a few of the more common styles, as well as galvanized window and door cap for the sheet metal worker who is not equipped for this work. A line of galvanized finials is illustrated, together with galvanized iron and copper crestings, ventilators and ornamental conductor heads. The contracting sheet metal worker is also given illustrations of the stamping work, such as letters, wreaths, scrolls and geometrical designs. The last few pages of the book are devoted to corrugated and roll roofing and sheet metal siding, together with sheet iron and tinners' trimmings, such as gutters, miters, conductor pipes, elbows and shoes. A new line of goods is shown in the way of fireproof doors and shutters. This concern also sells a line of fire door hangers and iron fire escapes.

The Energy Elevator Company has shipped a large hand power freight elevator for export to Japan, this being the third of the kind it has exported to that country. A steam power passenger elevator is being installed at Trenton, N. J., while a hand power freight lift has been erected in the Wilmington shops for the Pennsylvania Railroad. The demand recently has been largely for elevators of the hand power freight type. Among recent deliveries of heavy hand power elevators by this company may be noted shipments to Lubec. Maine; Hartford, Conn.; Elkins, W. Va.; Starkville, Miss., and Clemens, Iowa.

The Penn Metal Ceiling & Roofing Company, Limited, Twenty-third and Hamilton streets, Philadelphia, Pa., is sending to the trade a new 175-page catalogue illustrating its many specialties in stamped sheet metal work for building purposes. This catalogue is specially notable for the high grade of the illustrations presented as well as the artistic designs given and the number of high grade panels, bas relief plates and frames, such as are used for decorating club rooms, private residences and churches. A series of illustrations in conjunction with some explanatory text gives to the sheet metal worker an idea of the manner in which these ceilings and sheet metal coverings are fastened to the walls. The first portion of the book is devoted entirely to ceiling and side wall plates in a variety of designs, ranging from the plain pebble panel to elaborately enriched coves. A number of center pieces are also shown which can be used with ventilators when desired. Zinc stamped ornaments for attaching to cornices and other sheet metal work like zinc and copper capitals and brackets to be used in conjunction with cornice work are illustrated. Some of the illustrations in the back of the book show ceilings and side walls as installed in schools, hospitals, jewelry stores, restaurants and drug stores in numerous cities throughout the country.

The Steel City Electric Company, Third street and Penn avenue, Pittsburgh, Pa., has issued a neat little pamphlet calling attention to Star bushings and other contractors' supplies, such as Fullman water tight floor outlets, insulator supports, beam straps, the object of which device is to fasten the wood block or strip to the beam; the Thompson reaming device and hand conduit benders.

The wire glazed hollow metal window frame, which is admittedly an effective and reliable fire stop, lends special interest to a booklet recently issued by the Edwards Mfg. Company, "The Sheet Metal Folks," Cincinnati, Ohio. While statistics have been produced to show that one-third of the fire losses sustained in this country is chargeable to what is known as the exposure hazard—that is, fire communicated from one building to another through windows or roofs—and while people appreciate the value of the metal window, the lessons from the San Francisco conflagration have greatly substantiated the fire resisting qualities of this type metal window frame, as they had, indeed, been fully proved in the Baltimore fire. Besides this booklet on fire resisting sheet metal construction, the company has in preparation a new catalogue of metal ceilings and side wall designs of different periods, which book can be regarded as taking up the field of sheet metal as a means toward interior decoration. The company has recently been installed in its new, commodious plant on Eggleston avenue, in Cincinnati, where it is devoting its entire attention to the production of sheet metal working material, including Edwards' metal ceilings, metal shingles, metal fireproof windows, cornices, skylights, corrugated iron and steel roofing, steel imitation brick and stone siding, galvanized roofing, crestings, finials and the like.

The Canton Mfg. Company, Canton, Ohio, calls attention in its advertising space this month to the fact that it is in a position to furnish builders with cornice, conductor pipe, metal ceilings, hangers, eave trough, ventilators, skylights, &c., according to requirements. A catalogue has been issued by the concern showing the leading lines manufactured and a copy of it can be secured upon application.

The Garry Iron & Steel Company, Cleveland, Ohio, is sending out to architects, builders and others likely to be interested, samples of the Cleveland expanded metal lath, which are attached to a stiff cardboard folder of a nature to be readily sent through the mail. This expanded lath is furnished either plain, painted or galvanized and in 24, 26 or 27 gauge. The sheets are 16½ x 96 in., and in a bundle are 18 sheets or 22 sq. yd. The sheets are cut without pickling, and therefore less liable to rust, and there is a selvage at both edges of a sheet. This lath, it is claimed, is suitable for ornamental as well as plain work, and is especially adapted for exterior stucco work. The samples attached to the folder are 6¼ in. in length by 3 in. in width, and represent both the plain and galvanized finish of 27 gauge.

The Prong Lock System of steel studding and furring for fireproof walls, partitions and ceilings is illustrated and described at length in a very attractive publication sent out by the Berger Mfg. Company, Canton, Ohio. The parts which compose this system of fireproofing are made of 18 or 20 gauge sheet steel anti-rust coated, and shaped to give a maximum of strength. The illustrations show details of various forms of application in connection with partitions, ceilings, &c., and there are half-tone engravings of buildings in connection with which the system has been employed. Among these may be mentioned the Hayward or Kohl Building, the pictures representing it both before and after the San Francisco earthquake and fire. A neat folder sent out deals with Berger's Star Spangled terne plate, while another gives impressive facts regarding the corporation and the specialties which it turns out in the way of steel ceilings offered in 10 styles.

The August issue of *Graphite*, published by the Joseph Dixon Crucible Company, Jersey City, N. J., for the purpose of establishing a better understanding in regard to the different forms of graphite and their respective uses, has something to say regarding the Jersey City fund collected for the San Francisco sufferers, some notes growing out of the Master Car Builders' and Master Mechanics' conventions attended by Mr. Walker, vice-president and general manager of the Dixon Company, and an illustrated article in regard to Dixon's graphite exhibit at the conventions recently held at Atlantic City. The issue is replete with matter pertinent to the question of graphite and its uses, and is thoroughly in keeping with the standard set by the company for its publication.

The James Leffel & Co., Springfield, Ohio, has just issued a neat catalogue of 52 pages illustrating and describing its line of steam engines and boilers, and giving details in a way to interest those likely to require anything in the steam power line. A copy of the little work can be obtained on application.

W. H. Ostendorf, 2923 North Broad street, Philadelphia, Pa., has issued an illustrated catalogue relating to mantels, grills, &c., which he is prepared to furnish direct to the user, thus saving the middleman's profit. The statement is made that the design and quality of work is first-class in all respects, and that the mantels and grills which form an important part of the interior finish of the modern house are made in large variety to harmonize with the woodwork of the different rooms in connection with which they may be used. The point is made that grills improve the appearance of doorways and arches and can be had in many beautiful and decorative shapes. In addition to the goods named Mr. Ostendorf also furnishes slate laundry tubs, gas grates, fireplace fittings, tile and marbleized slate wainscoting for vestibules, bathrooms and halls, paraquetry flooring, &c. Those who are interested can secure a copy of this catalogue free on application.

We have before us a little pamphlet of a size convenient to carry in the pocket, entitled "Treatise on Painting, Decorating, Hardwood Floors, Heating, Ventilating, Sheet Metal and Cornice Work," by Cecil Pickard, a general contractor of Anderson, Ind. The matter is presented in a way to interest the reader, and it has been the aim of the author to present the facts relating to the different trades represented in such a way as to be of convenience and value. While primarily issued for advertising purposes much of the information presented is of such a nature as to be of interest to the general reader.

Some valuable tables for the building contractor are contained within the covers of a little pamphlet, which is being sent out by the United States Gypsum Company, Chicago, Ill., giving as they do the number of square yards and feet in several thousand rooms of varying size. Each table is said to have been verified, and the figures can be relied upon as correct. Other features of the pamphlet are lists of brands of wall plaster, detailed information concerning which can be obtained from the company. The little pamphlet will be found of especial service to the plasterer in figuring the wall surface of rooms and also by the builder when making up his estimate on a job of work.

Manufacturers of portable school buildings will be interested in an announcement presented in another part of this issue by the Department of Education, Porto Rico, which solicits correspondence with firms equipped to manufacture structures of this kind. The approximate dimensions of the buildings wanted are given, together with other particulars of value in this connection. Those who are interested should address "Commissioner of Education, San Juan, Porto Rico."

The Dowman-Dozier Mfg. Company, Atlanta, Ga., has recently booked orders for the metal windows to be placed in the new building of the American Can Company, at Savannah, Ga., metal ceiling for the Bank of Taldotton, at Taldotton, Ga., the sheet metal work on the new building of the City Electric Light Plant, Dotham, Ala., and for all the fireproof metal windows to be placed in the new terminal buildings of the Louisville & Nashville Railroad at Atlanta, Ga.

The Edwards Mfg. Company, "The Sheet Metal Folks," Cincinnati, Ohio, is erecting another addition to its present plant, 137 x 200 ft. in plan and two stories in hight, giving when completed a total frontage on Eggleston avenue of 270 ft., with a depth of 200 ft. The entire buildings are constructed of wood, covered with sheet metal products of the company's own manufacture.

The question of quality is the subject of the leading article in the August issue of the *Cortright Metal Shingle Advocate,* the publication of the Cortright Metal Roofing Company, Philadelphia and Chicago, devoted to the Cortright metal shingles. The issue also contains an illustrated article on the Cortright hip covering, showing how it is used in connection with metal slates, and there is a considerable amount of advice and something in lighter vein.

The Ideal Concrete Machinery Company, South Bend, Ind., has commenced to manufacture its Ideal block machines in Canada, the factory and office being situated at 124 York street, London, Ont. So many inquiries were pouring in from the Canadian provinces that the company found it an absolute necessity to start the manufacture of them and has opened an office in charge of F. M. Leach. Machines have already been produced, and shipments of Canadian orders are being made.

The Marshalltown Trowel Company, Marshalltown, Iowa, is distributing an interesting pamphlet of 12 pages illustrating the leading lines of specialties manufactured. Attention is called to finishing trowels, an illustration of one of which appeared in a recent issue of this journal in our Novelties Department, tool bags, plasterers' cork floats, brick hammers, beading tools, sidewalk edgers, groovers, &c. In connection with the illustrations are brief particulars relative to sizes, prices, &c. The entire make up of the work is neat and attractive, and is of a nature to be of special interest to the trade addressed.

The Chattanooga Roofing & Foundry Company, Chattanooga, Tenn., has opened an office at 440 Greenwich street, New York City, where it will carry a stock of grates, fireplace trimmings, New Century metal shingles, &c. The office will be in charge of William L. Latta.

This is our New Ware House

50 x 50 feet, three floors.
Capacity, 7000 columns.

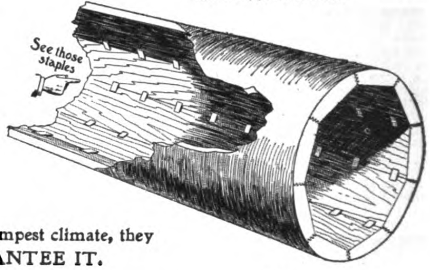
All orders for columns in stock sizes shipped same day as received.

Cut of Staple is three quarter size.

THEY CANNOT OPEN AT THE JOINTS.

Columns are glued up under enormous pressure and then the staples are driven in as shown in illustration by our special machinery.

FREE OFFER On Receipt of Postal saying where you saw this Adv. we will send you postage paid a Sample Section of this Column, showing the wonderful Lock Joint.



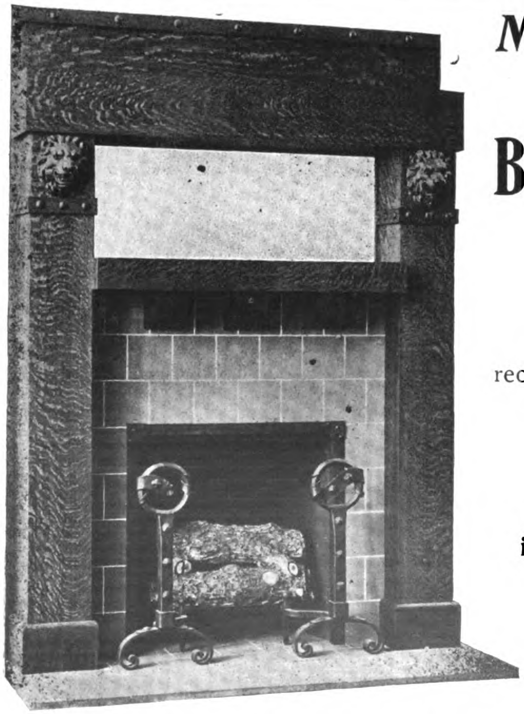
Put them where you will, in the hottest room, the driest or dampest climate, they POSITIVELY WILL NOT OPEN. WE GUARANTEE IT.

Made only by

AMERICAN COLUMN COMPANY, BATTLE CREEK, MICH.

DON'T TAKE SUBSTITUTES.

Patented in United States and Canada.



Mantel Satisfaction

is assured if you buy

BURRITT MANTELS

Because they represent the maximum value at the minimum price.

Here's the proof as shown by letters received from our customers :

"Well pleased."
"Better than I expected."
"Splendid value."
"Will send another order soon," etc., etc.

if YOU need Mantels write TO-DAY for our catalogue.

Mantels in special sizes and woods for special requirements. Write us concerning your needs.

If we can save you money, you want to know it, don't you?

THE A. W. BURRITT CO.
"THE MANTEL FOLKS."

400 KNOWLTON STREET,
BRIDGEPORT, CONN.

Wood Carvings

Hand and Machine Carvings, Mouldings, Festoons, Newel Posts, Head Blocks, Rope and Twist Balusters and Ornaments. We also make a specialty of Fine Staved Up Quartered Oak and Birch Columns for Interior Work.

Almost 1,500 designs illustrated in our New Catalogue and Price-List No. 20. Mailed for 15c. in stamps.

Waddell Mfg. Co.,

Corner Taylor and Coldbrook Sts.,
GRAND RAPIDS, MICH., U. S. A.

No. 0575

Chicago Metal Covering Company

69-71 N. GREEN STREET, CHICAGO, ILLS.

METAL COVERED WOOD MOULDINGS

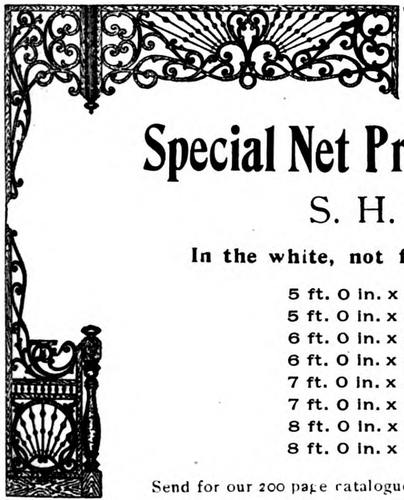
Of Every Description

Made in

GERMAN SILVER, BRASS, COPPER, GOLD, BRONZE,
STEEL, ALSO OXIDIZED COPPER

Metal Drawn To Any Desired Design

WRITE FOR CATALOGUE No. 8



Special Net Prices on Grilles

S. H. 1072½

In the white, not filled and varnished.

5 ft. 0 in. x 8 in.,	$9.60
5 ft. 0 in. x 9 in.,	10.00
6 ft. 0 in. x 8 in.,	10.80
6 ft. 0 in. x 9 in.,	11.25
7 ft. 0 in. x 8 in.,	12.00
7 ft. 0 in. x 9 in.,	12.75
8 ft. 0 in. x 8 in.,	13.20
8 ft. 0 in. x 9 in.,	13.75

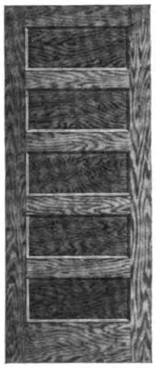
Send for our 200 page catalogue showing a large assortment of millwork for prompt delivery.

Schaller-Hoerr Company

416-426 Blue Island Ave., Chicago, Ill.

50% SAVED

OAK VENEERED DOORS IN STOCK ALL SIZES.



MADE IN STOCK QUANTITIES, SOLD AT STOCK PRICES, CARRIED IN STOCK

THE FOSTER-MUNGER CO.

AMERICAS GREATEST SASH & DOOR HOUSE
CHICAGO, U·S·A·
WRITE FOR VENEERED DOOR BOOK 1448 A

THE NEW BOOK

"Strength of Beams, Floors and Roofs"

Makes easy the Designing and Figuring of Wooden Beams and Trusses.

TWO DOLLARS, PREPAID.

DAVID WILLIAMS COMPANY, Publishers, 14-16 Park Place, New York.

WORTHLEY'S
PATENT

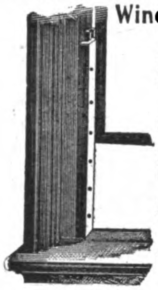
SLOW FEED MANGER

17-Inch Size, $1.60 each.

U are welcome to a copy of our VANE CATALOGUE

BROAD GAUGE IRON STALL WORKS,
53 Elm St., Boston, Mass.

King's Automatic Weather Strip
Window and Door Stop



The only perfectly satisfactory weather strip, window and door stop on the market.

Keeps out cold and dust.

Makes a perfectly tight joint.

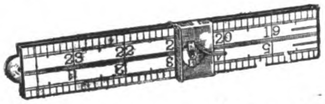
Windows can be raised and lowered to desired position without the use of fasteners or of weights.

Do not build a house until you have investigated the merits of these strips.

Write for prices.

MANUFACTURED BY
The King Manufacturing Co
Newton, Ia.

The Handy
Rule Gauge



It clamps on any standard two-foot rule, and can be adjusted or removed in an instant.

A great convenience to carpenters and has many uses.

Sold by the hardware trade.

Price, 15c.

CALDWELL MFG. CO.,
5 Jones Street, Rochester, N.Y.

GRINDSTONES.

Mounted Grindstones for Carpenters' or Anybody's Use.

THE CLEVELAND STONE CO.,
6th Floor, Hickox Bldg. CLEVELAND, O.

$2.00 Remitted in any safe way will secure you a copy of the new book

STRENGTH OF BEAMS, FLOORS AND ROOFS

By F. E. KIDDER

With a copy within reach you will never lack direction for designing and figuring a wooden truss of any ordinary type.

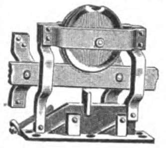
Not the least important, a good many wrong ways and fundamental mistakes which the Builder is apt to fall into are pointed out.

Simple Methods
No Intricate Formulæ

222 Pages. 164 Illustrations.

DAVID WILLIAMS CO.
Publishers
14-16 Park Place . New York.

"LANE'S BALL BEARING"
Is the best House Door Hanger made

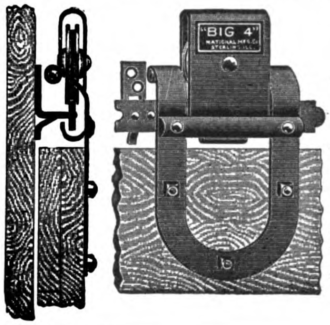


Has an ALL steel frame.

Cups, Cones and Balls are of the same material, made and hardened by similar processes as best bicycle parts.

Sold by the hardware trade. Send for circulars to

LANE BROTHERS CO.,
423-455 Prospect St., - POUGHKEEPSIE, N. Y.



"BIG 4"
FLEXIBLE DOOR HANGER.

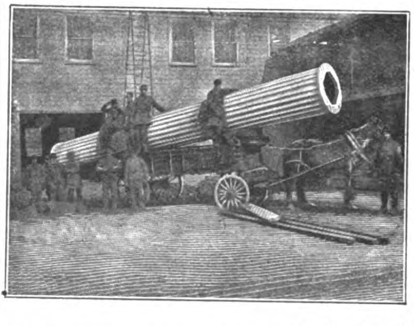
Anti-Friction. Cannot Jump the Track.
Exclusive Sale Given.

NATIONAL MFG. CO.,
STERLING, ILL.

Grand Rapids Wood Carving Co.,

GRAND RAPIDS, MICH.

Catalogue on application.



THE LARGEST LOCK JOINT COLUMN EVER BUILT.

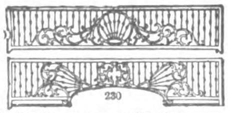
40½" in diameter, 33-10 in. long.

One of four furnished by us for the Portico of the Allenhurst Club, Allenhurst, N. J.

HARTMANN BROS. MFG. CO.
Mt. Vernon, N. Y., U. S. A.
New York Office: 1123 Broadway.
Also
Henry Sanders Co., Chicago, Ill.
A. J. Koll Planing Mill Co.,
Los Angeles, Cal.

MANUFACTURERS OF
KOLL'S PATENT LOCK JOINT COLUMNS FOR PERGOLAS, PORCHES OR INTERIOR USE.
Send for Catalogue D 19.

GRILLES "Direct from Factory" MANTELS



No. 225—48x12 inches, **$3.60.** Retail value, $7.00.

No. 230—48x14 inches, with Curtain Pole, **$4.50.** Retail value, $9.00.

Others from $2.50 up. Largest assortment. Division Screens and special Grilles to order.

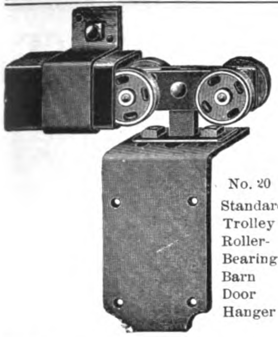
Tile and Mosaics
for everywhere.
Walls, Floors, etc.

$13.25 buys this solid oak Mantel, 80 in. high, 54 or 60 inches wide, 28 x 16 Mirror. Heavy columns and elaborate capitals. Tile facing and hearth with Plated Frame and Club House Grate, $10. extra.

HARDWOOD FLOORS
will last as long as the house. Any carpenter can lay it easier than ordinary flooring. Get our prices.

Write for catalog of Mantels, Grates, Tiles for floors and baths, Slate Laundry Tubs, Grilles, etc. It is free. Or send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from **$12 to $200.**

W. H. OSTENDORF, - - - - - - 2923 N. Broad St., Philadelphia, Pa.

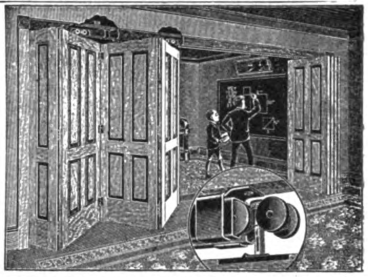


RICHARDS
DOOR HANGERS
are the best.

Made for sliding doors of all sizes and weights.

Popular with architects and builders.

Sold by dealers.



No. 135 Ball-Bearing Swivel Door Hanger for folding doors. Vertical Adjustment.

The Richards Mfg. Co., Aurora, Ill.

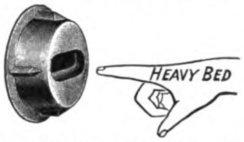
New York Office, 101 Reade St.

Send for Catalogue of Door Hangers, Fire Door Fixtures, Conveying Systems.

THE IVES' PATENT WINDOW STOP ADJUSTER
PATENTED

FOR WINDOWS AND SLIDING DOORS

Insures Protection against Cold Draughts, Dust, Rattling or Binding.

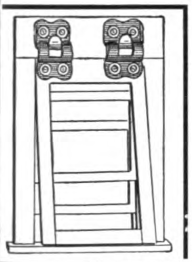


The only Window Stop Adjuster made from one piece of metal that has a heavy bed that will not bend or cup in tightening the screw.

THE H. B. IVES CO.

40 Page Catalog mailed free. **New Haven, Conn., U. S. A.**

YOU CAN MAKE AND SELL MORE



STORM WINDOWS
if you hang them with
GOSSETT DETACHABLE SUSPENSION HINGES

Your customers will be better pleased. Storm sash so attached can be opened for ventilation. Put up, taken down or replaced with screens without the use of ladder or tools. Sample pair free if you mention this paper. Sold by dealers in Hardware and Building Material.

F. D. KEES MFG. CO., Beatrice, Nebr.

LATEST DESIGNS IN
Builders' Hardware

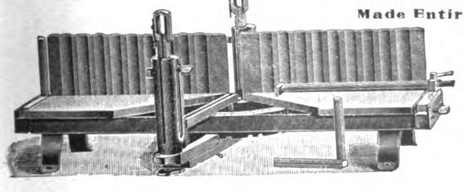
Our new Catalogue sent Free to Contractors and Material Men upon request.

REHM HARDWARE COMPANY

354 Blue Island Ave., Chicago

GOODELL MITRE BOX
Made Entirely OF STEEL.

No More Breaking.



Most desirable Box on the market, being way ahead in quality and improvements.

Send for Folder.

GOODELL MFG. CO.
GREENFIELD MASS.

Why You Should Use the Blount Door Check?

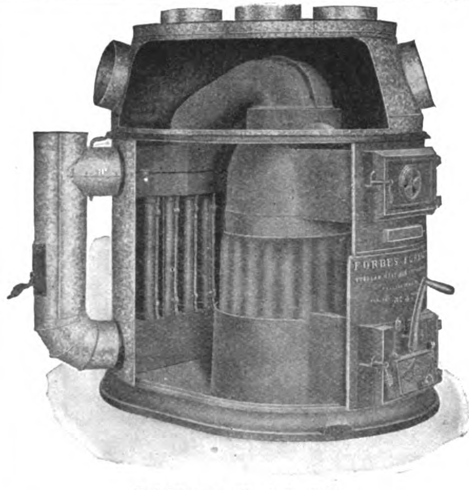
It is the original successful liquid door check and still the best. The latter fact is proved by the substitution of the BLOUNT every year for hundreds of other checks which fail to stand up under hard service. Parts of the BLOUNT are made so accurately that a piece from a check of a given size will fit any other check of the same size without machining. This is suggestive of careful workmanship. Repair men say that the BLOUNT is "better made and made from better material."

There are also improvements in its design that enable it to do more effective work with less wear. The quick release action and the adjustment of the checking action are both exclusive features and add much to its effectiveness.

The Yale & Towne Blount Check is carried in stock by successful Hardware Dealers.

Write for the little story, "The Peacemakers," which tells in an amusing way about a quarrel between two men and how a BLOUNT CHECK settled it.

THE YALE & TOWNE Manufacturing Company
9 MURRAY ST. NEW YORK


Height over all, 4 ft. 3 in.

THE FORBES FURNACE

Burns Either Hard or Soft Coal

EVERY ONE GUARANTEED IF PROPERLY INSTALLED

No Sheet Iron Drums—Entirely Cast Iron—Radiating Drums 1-8 Inch Thick, Will Wear for Years

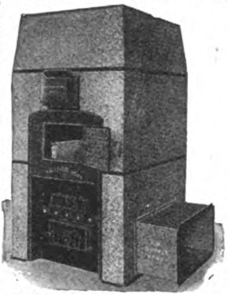
YOU RUN NO RISK IN PUTTING IN THE FORBES FURNACE

SEND FOR CATALOG AND FULL PARTICULARS

Tubular Heating & Ventilating Co.
228 Quarry St., Philadelphia

LEADER Steel Furnace $49

Our No. 45 Steel Furnace, without pipes or registers, we send anywhere, freight prepaid east of Omaha, for $49. You can't match it in your town for any such money. It will heat a house of 7 or 8 rooms, store, school or small church. Has steel body with riveted and lined galvanized iron casing. Has brick fire box. Regulated by chains. Burns soft or hard coal, wood or coke. Any man can set it up successfully, putting pipes, registers and smoke pipe in proper positions from our clear detailed descriptions. Don't pay others for what you can do as well yourself. Write for our instructive book, "Modern Furnace Heating," a 40-page book on the science of heating a house. It warns you what to avoid and how to benefit by the mistakes of others. Every house owner should have it. It's valuable. Send for it now. It's free.



Hess Warming & Ventilating Company,
709 Tacoma Building, Chicago, Illinois.

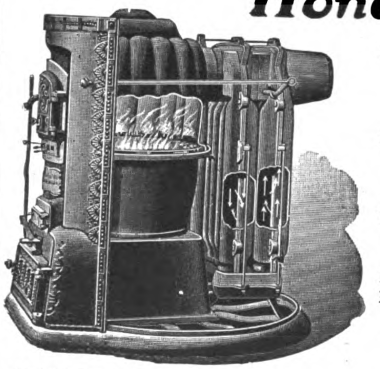
The Carpenter and Builder who *insists* that the local dealer furnish heating apparatus marked "made by the

INTERNATIONAL HEATER CO.,"

will never be in hot water himself. This "F" series HOT WATER HEATER invariably gives satisfaction.

UTICA, N. Y.
New York. Boston. Chicago.

Honest Value!



Nothing Light Weight or Frail about the

Bengal Furnace

It's heavy—but well proportioned, and the weight placed where it will give big heating capacity and great durability.
When properly installed you can depend on plenty of pure warm air,—and small coal bills.
Burns hard or soft coal.
If you are looking for an honest Furnace—one you can depend upon—ask for our proposition.
DO IT NOW!

THE FLOYD WELLS CO., Manufacturers, Royersford, Pa.

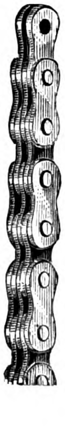
When you buy
ECCENTRIC CLAMPS
specify

COLT'S

There is a difference—let us tell you
Ask for catalogue No. 129.
BATAVIA CLAMP CO.,
23 Center Street, BATAVIA, N. Y.

Forest City Bit & Tool Co., Rockford, Ill., U. S. A.

Manufacturers of Wood Boring Bits, Hollow Mortising Chisels, Common Mortising Chisels and Tools
Send for CATALOG "G" Send for



THOMAS MORTON,

169 Elm Street, New York.

Copper Cable, Steel Cable, Champion Metal, Steel Champion,

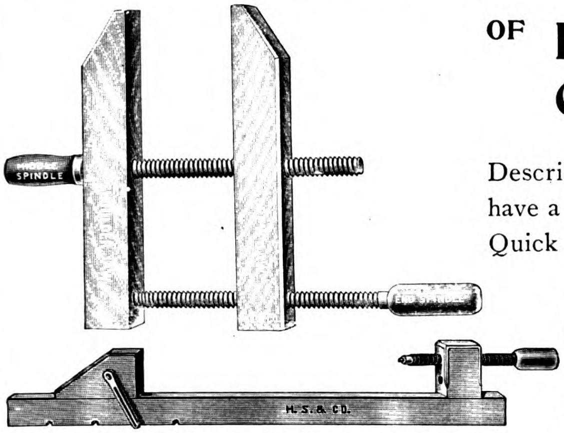
SASH CHAINS.

CHAINS

For Suspending Heavy Doors, Gates, etc.
All of SUPERIOR QUALITY.

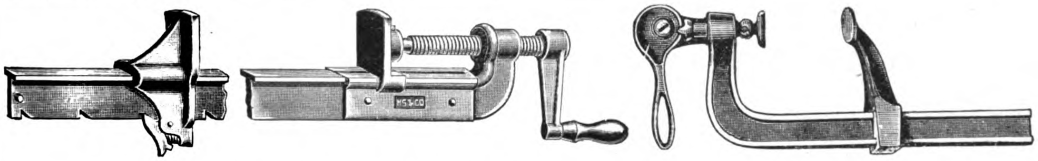
A COMPLETE LINE

OF HAND SCREWS, CLAMPS, ETC.



Described in our Catalogue No. 2009. We also have a Special Catalogue No. 2010 of the "Colt's Quick Acting Clamps." Send for copies of both.

If you are interested in Saws and Planes, you should have our Catalogue No. 2011 of the former, and No. 2012 of the latter. Both complete in every way.



HAMMACHER, SCHLEMMER & CO.

Hardware, Tools and Supplies

4th Ave. and 13th St. **NEW YORK, SINCE 1848** **(Block South of Union Square)**

TOWER'S CHAMPION SCREW DRIVERS

FOR SIXTEEN YEARS THE ACKNOWLEDGED STANDARD.

Every Blade Is Tested to Split a Screw Head.

AVOID Imitations of CHAMPION Screw Drivers. None Genuine without the name "CHAMPION" which is our Trade Mark and Guarantee.

TOWER & LYON CO.

95 Chambers Street, New York.

"Forstner" Brace and Machine Bits

For Fine Carpenter, Cabinet and Pattern Work

Specially Adapted for Hardwood Working.

The Forstner Labor-Saving Auger Bit, unlike other bits is guided by its *Circular Rim* instead of its centre; consequently it will bore any arc of a circle and can be guided in any direction regardless of grain or knots, leaving a true polished surface. It is preferable and more expeditious than chisel, gouge, scroll-saw, or lathe tool combined, for core-boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon moulding and mortising, etc.

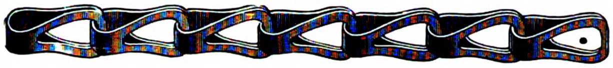
To introduce this high grade tool among carpenters, pattern makers, and others, we will mail to any reader of "Carpentry and Building," upon receipt of 50c. any bit we make from ¼ inch to 1 inch in size.

Manufactured by

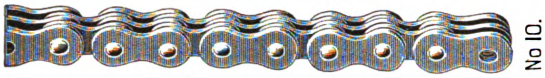
The Progressive Mfg. Co., Dept. "A", Torrington, Conn.

Enquire of your Hardware Dealers or write us direct. Supplied in Sets. Write for Catalogue.

SASH CHAIN



CABLE CHAIN



JACK CHAIN

The SMITH & EGGE MFG. CO.
Bridgeport, Conn.

Manufacturers of "**Giant Metal**" **Sash Chains**
" " "**Red Metal**" " "

Cable Chains, Jack Chain, Bell Hangers' Chains
and Plumbers' Chains
Made in Brass, Copper and Steel
WRITE FOR CATALOGUES AND PRICES

We are the ORIGINATORS of SASH CHAIN as a SUBSTITUTE for sash cord

---

The Mark of Quality

HARGRAVE

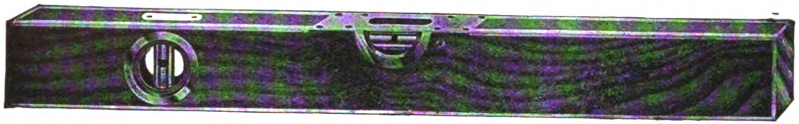
HARGRAVE'S SPOKE SHAVES ARE BEST

In quality, finish and design. Specify these goods to your dealer. Take no other. Write for catalogue No. 200

THE CINCINNATI TOOL CO., (Norwood), Cincinnati, Ohio.

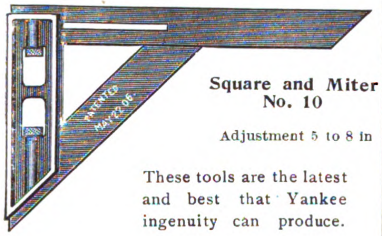
THE AKRON ECLIPSE LEVELS

Manufactured by **The BAKER McMILLEN CO.**
AKRON, OHIO.



We have a proposition that will interest every carpenter Drop us a postal and we will send it to you.

The Fox Tools



Square and Miter No. 10

Adjustment 5 to 8 in

These tools are the latest and best that Yankee ingenuity can produce.

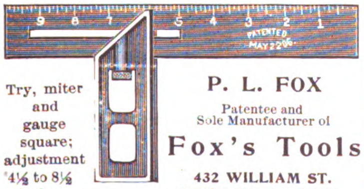
Octagon and Miter No. 12

This tool is designed for marking octagons and miter sliding blade will allow of long or short cut.

Avoid Imitation.

None genuine without sliding blade.

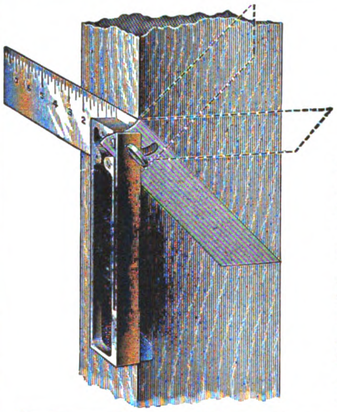
The Gem Square and Miter No. 11



Try, miter and gauge square; adjustment 4½ to 8½ inches.

P. L. FOX
Patentee and
Sole Manufacturer of
Fox's Tools
432 WILLIAM ST.
BRIDGEPORT, CONN.

If your dealer won't furnish them write me.



SOMETHING NEW

Ideal Bevel Try Square

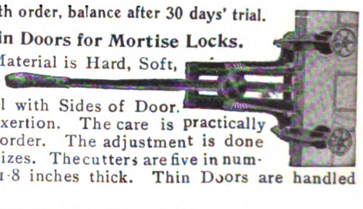
By having this combination try square you save time, also the price of one tool. You can see by cut how easy it is to change the bevel blade to any desired position to make the square and bevel cut with one stroke of the pencil.

NICHOLLS MFG. CO., OTTUMWA IOWA.

Miller's Hand Mortiser

PRICE $12.00. $4.00 with order, balance after 30 days' trial.

Its Work is to Make Openings in Doors for Mortise Locks.



The time is Three Minutes. The Material is Hard, Soft, Cross Grained and End Wood.

The job is Clean, True and Parallel with Sides of Door. The Labor is Performed with slight exertion. The care is practically none, as the tool does not get out of order. The adjustment is done in a moment's time for the different sizes. The cutters are five in number, and cover locks from 1 2 to 1 1-8 inches thick. Thin Doors are handled as easily as Thick Doors.

Riverside, Cal **A. W. MILLER MFG. CO.** Cincinnati, O

HICKS' BUILDERS' GUIDE

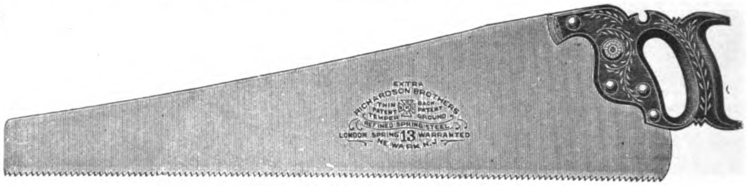
In its 17th Thousand.

The Contents:

Points on Estimating; Geometrical Measurements of Roofs; Hip and Valley Roofs; Estimating Labor for Carpentry Work; Short Cut in Estimating; Practical Methods of Construction; Binding Sliding Doors; Art of Roof Framing (an extended section, pages 87 to 150); Mitering Plancers, Mouldings, Etc. One Dollar, Postpaid.

DAVID WILLIAMS COMPANY, Publishers, 14-16 PARK PLACE, NEW YORK

OLD RELIABLE RICHARDSON SAWS.



ESTABLISHED 1860.

The peer of them all. Try one and be convinced. Every saw fully warranted.

NATIONAL SAW CO. Operating Richardson Bros. **NEWARK, N. J.**

Quality Tells

WHEN HENRY DISSTON WAS ASKED THE QUESTION: "WHAT DO YOU PUT IN YOUR SAWS?"
HE REPLIED: "GOOD STEEL AND HONEST WORK."

UPON THIS FOUNDATION IS BUILT DISSTON QUALITY.

"If you want a saw it is best to get one with a name on it that has a reputation. A man who has made a reputation for his goods knows its value as well as its cost and will maintain it."

ESTABLISHED
1840

HENRY DISSTON & SONS, Inc.
PHILADELPHIA, PA.

Something to be Proud of

LOTS AND LOTS OF INSTITUTIONS

Purchasing Agents for U. S. Army.
Purchasing Agents for U. S. Navy.
Many others we haven't space for have adopted

← This book as their standard on Wood Working Tools, Machinery and Supplies.

And They All Agree On

THIS BOOK →

As their authority on Metal Working Tools, Machinery and Supplies. If you haven't them—most everybody has—send 25 cents apiece for them and we will send promptly.

The Chas. A. Strelinger Co.,

Box B. **DETROIT, MICH.**

IF you are at all interested in the question of good pumbing, get the new book

Plumbing and House Drainage Problems

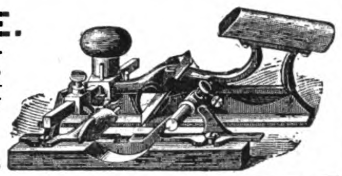
The Sixth Edition, Revised and Enlarged.

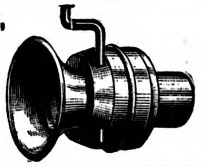
All phases of Plumbing, Drainage and Water Supply are expertly treated.

309 pages, 197 illustrations.

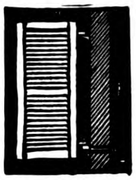
TWO DOLLARS, PREPAID.

DAVID WILLIAMS COMPANY,
14-16 Park Place, New York.





WOOD WORKERS
TOOLS
WM. P. WALTER'S SONS



Alphabetical List of Advertisers.

American Column Co.	58
American Rolling Mill Co.	10
American Wood Working Machinery Co.	6
Asphalt Ready Roofing Co.	1
Baker McMillen Co.	65
Barnes, W. F. & John Co.	4
Barnes Tool Co.	10
Barnett, G. & H., Co.	1
Batavia Clamp Co.	66
Berger Mfg. Co.	10
Bommer Bros.	1
Boston Bolt Co.	10
Bostrom-Brady Mfg. Co.	65
Boynton Furnace Co.	16
Bradt Pub. Co.	10
Bridgeport Chain Co.	68
Burlington Venetian Blind Co.	68
Burritt, A. W. Co.	58
C. A. Mfg. Co.	15
Cabot, Samuel	1
Caldwell Mfg. Co.	60
Canton Mfg. Co.	8
Canton Steel Roofing Co.	14
Cardwell, C. W. Mfg. Co.	66
Chattanooga Roofing & Fdy. Co.	51
Chicago Machinery Exchange	6
Cincinnati Tool Co.	65
Cleveland Stone Co.	67
Columbia Mineral Wool Co.	16
Comstock, Wm. T.	68
Cordesman, Meyer & Co.	8
Cordesman-Rechtin Co.	7
Cortright Metal Mfg. Co.	12
Crescent Machine Co.	7
Davis & Cook	62
Diamond Expansion Bolt Co	10
Dieckman, F.	14
Disston, Henry & Sons	66
Dixon, Jos., Crucible Co.	67
Drouve, G. Co.	14
Eastern Granite Roofing Co	13
Eaton & Prince Co.	51
Edwards Mfg. Co.	12
Eller Mfg. Co.	13
Energy Elevator Co.	9
Fay, J. A. & Egan Co.	5
Floyd, Wells Co.	63
Ford Auger Bit Co.	68
Forest City Bit & Tool Co.	60
Foster Munger Co	60
Fox Machine Co.	8
Fox, P. L.	65
French, Samuel H. & Co.	15
Frink, I. P.	68
Gage Tool Co.	16
Globe Ventilator Co.	15
Goodell Mfg. Co.	61
Grand Rapids Hdw. Co.	8
Grand Rapids Wood Carving Co.	60
Grinnell Publishing Co.	6
Hamlin, George R.	10
Hammacher, Schlemmer & Co.	64
Hartmann Bros. Mfg. Co.	60
Hess Warming & Ventilating Co.	62
Hight, A. W.	63
Hitchings Co.	51
Howes, S. M., Co.	68
Hurley Machine Co.	8
Ideal Concrete Machinery Co.	9
Interior Hardwood Co.	1
International Cor. Schools.	7
International Heater Co.	68
Ives, Hobart B. & Co.	61
Jennings, C. E. Co.	68
Johnson, E. J., Co	13
Johnson, S. C., & Son	57
Kanneberg Rfg. & Ceil. Co.	15
Karol, B. C.	8
Kees. F. D. Mfg. Co.	61
Keighley, S. Metal Ceiling & Mfg. Co.	14
Kidder, R. E.	14
Kimball Bros. Co.	9
King Mfg. Co.	60
Kinnear & Gager Co.	10
Lane Bros. Co.	60
Lestershire Lumber & Box Co	15
Long Island Machinery Co.	6
Lord & Burnham Co.	51
Mallory Mfg. Co.	67
Marston, J. M. & Co.	5
Mesker & Bro.	14
Meyers, F. J. Mfg. Co.	9
Miller, A. W., Mfg. Co.	59
Millers Falls Co.	68
Montross Metal Shingle Co.	18
Morse, Williams & Co.	9
Morton, Thomas	59
Mullins, W. H. Co	12
National Mfg. Co.	60
National Roofing Co.	8
National Saw Co.	66
Nat'l Sheet Metal Rfg. Co.	15
New Jersey Zinc Co.	13
N. Y. Steel Corner Plate Co.	15
Nicholls Mfg. Co.	65&67
North Bros. Mfg. Co.	67
O. K. Harry Steel Wks.	5
Ostendorf, W. H.	60
Ostrander, W. R. & Co.	67
Parks Ball Bearing Machinery Co.	5
Pettyjohn Co.	9
Phila. & Boston Face Brick Co.	16
Pike Mfg. Co.	1
Progressive Mfg. Co.	64
Reed & Auerbacher Co.	16
Rehm Hardware Co.	61
Rich, J. & G.	67
Richards Mfg. Co.	61
Sackmann, F. A.	5
Samson Cordage Works	68
Schaller-Hoerr Co.	59
Sedgwick Mch. Works	9
Seneca Falls Mfg. Co.	4
Shimer, Samuel J. & Sons.	7
Silver Lake Co.	68
Simonds Mfg Co.	16
Smith, Otis A.	67
Smith & Egge Mfg. Co.	65
Standard Paint Co.	11
Stanley Rule & Level Co.	67
Stanley Works	1
Star Encaustic Tile Co.	12
Starrett, L. S. Co.	1&68
Stowell Mfg. Co.	11
Strelinger, C. A. Co.	66
Taintor Mfg. Co.	68
Topp, G. A. & Co.	11
Tower & Lyon Co.	64
Tubular Heating & Ventilating Co.	63
U. S. Mineral Wool Co.	16
Van Dorn Iron Wks. Co.	5
Waddell Mfg. Co.	59
Walters, Wm. P. Sons	67
Warner Elevator Mfg. Co.	9
Washburne, E. G. & Co.	10
Wheeling Corrugating Co.	11
White, Van Glahn & Co.	68
Wilkinson, A. J. & Co.	67
Willis Mfg. Co.	12
Wood-Mosaic Flooring Co.	16
Yale & Towne Mfg. Co.	61

Classified List of Advertisers.

Annunciators
Ostrander, W. R. & Co.

Architects' Blue Prints

Architects' Details
Lestershire Lumber & Box Co.

Asbestos
Stowell Mfg. Co.

Auger Bits
Ford Auger Bit Co.
Jennings, C. E. Co.

Awnings
Chattanooga Roofing & Fdry. Co.
O. K. Harry Steel Works

Band Saws
American Wood Working Machinery Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Crescent Machine Co.
Fay, J. A. & Egan Co.

Blackboards, Slate
Johnson, E. J. Co.

Blinds
Burlington Venetian Blind Co.
Foster-Munger Co.
Schaller-Hoerr Co.

Blind Hinges
Stanley Works

Bolts and Nuts
Boston Bolt Co.

Books
Arthur, Wm.
Bradt Pub. Co.
Comstock, Wm. T.
Grinnell Publishing Co.
Williams, David, Co.

Boring Machines
Fox Machine Co.
Millers Falls Co.

Builders' Hardware
Boston Bolt Co.
Hammacher, Schlemmer & Co.
Rehm Hardware Co.
Yale & Towne Mfg. Co.

Building Brackets, Folding
Stanley Works
Tower & Lyon Co.

Building Material
Lestershire Lumber & Box Co.

Building Paper and Felt
Cabot, Samuel.
Standard Paint Co.

Builders' Supplies
Schaller-Hoerr Co.

Butts and Hinges
Stanley Works.

Capitals
Grand Rapids Wood Carving Co.
Waddell Mfg. Co.

Ceiling, Metallic
Berger Mfg. Co.
Canton Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Keighley, S. Metal Ceiling & Mfg. Co.
Kinnear & Gager Co.
Wheeling Corrugating Co.
Willis Mfg. Co.

Cement
French, S. H. & Co.

Cisterns, Steel
O. K. Harry Steel Works.

Clamps
Batavia Clamp Co.
Cincinnati Tool Co.

Concrete Block Machines
Ideal Concrete Machinery Co.
Pettyjohn Co.

Conductor Pipe and Elbows
Canton Mfg. Co.
Dieckmann, F.

Conductor Pipes
American Rolling Mill.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.

Conductor Shoes
Dieckmann, F.

Conservatories
Lord & Burnham Co.

Contractors' Supplies
Boston Bolt Co.

Cornices, Sheet Metal
Berger Mfg. Co.
Canton Mfg. Co.
Chattanooga Roofing & Foundry Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mesker & Bro.
Mullins, W. H. Co.
Willis Mfg. Co.

Cresting
Van Dorn Iron Works Co.
Willis Mfg. Co.

Cutter Heads
Shimer, Sam'l J. & Sons.

Designs and Details
(See House Plans)

Door Checks and Springs
Hammacher, Schlemmer & Co.

Door Checks, Screen
Caldwell Mfg. Co.

Door Hangers
Lane Bros. Co.
National Mfg. Co.

Draw Knives
Wilkinson, A. J. & Co.

Drawing Instruction
International Correspondence Schools.

Drawing Outfits
Comstock, Wm. T.
Rich, J. & G.

Drying Stoves
Drouve, G. Co.
Howes, S. M. Co.

Dumb Waiter Fixtures
Hammacher, Schlemmer & Co.

Eave Troughs
Chattanooga Roofing & Fdry. Co.
Eller Mfg. Co.
Wheeling Corrugating Co.

Elevators and Dumb Waiters
Eaton & Prince Co.
Energy Elevator Co.
Kimball Bros. Co.
Meyers, F. J. Mfg. Co.
Morse, Williams & Co.
Sedgwick Machine Works.
Warner Elevator Mfg. Co.

Etching Fluid
Reed & Auerbacher Co.

Expansion Bolts
Boston Bolt Co.
Diamond Expansion Bolt Co.

Fencing
O. K. Harry Steel Works.

Files and Rasps
Barnet, G. & H. Co.
Boston Bolt Co:

Floor Scrapers
Hurley Machine Co.

Framing Tools
Topp, G. A., & Co.

Furnaces and Heaters
Boynton Furnace Co.
Floyd-Wells Co.
Hess Warming & Ventilating Co.
International Heater Co.
Tubular Heating & Ventilating Co.

Gas and Electric Fixtures
Frink, I. P.

Grates, Fancy Plated
Chattanooga Roofing & Fdry. Co.

Greenhouses
Hitchings & Co.
Lord & Burnham Co.

Grille Work, Wood
Foster-Munger Co.
Waddell Mfg. Co.

Grindstones
Cleveland Stone Co.
Richards Mfg. Co.

Grooving Heads
Fox Machine Co.

Hangers, Barn Door
Richards Mfg. Co.

Hangers, House Door
Richards Mfg. Co.

Hardware Jobbers
White, Van Glahn & Co.

Hardware Specialties
Richards Mfg. Co.

Heaters.—*Steam and Hot Water.*
International Heater Co.
Lord & Burnham Co.

Hinges, Spring
Bommer Bros.

Hinges, Window Screen
Kees, F. D. Mfg. Co.

House Plans
Comstock, Wm. T.

Iron House Fronts
Mesker & Bro.

Iron Work
Van Dorn Iron Works Co.

Lath, Metal
Wheeling Corrugating Co.

Levels
Baker, McMillen Co.
Bostrom-Brady Mfg. Co.
Davis & Cook.

Lightning Rods
Washburn, E. G. & Co.

Locks
Rehm Hardware Co.
Yale & Towne Mfg. Co.

Lumber and Shingles
Lestershire Lumber & Box Co.

Mantels
Burritt, A. W., Co.
Foster-Munger Co.
French, Sam'l H. & Co.
Ostendorf, W. H.
Phila. & Boston Face Brick Co.

Masons' Stoves
Drouve, G. Co.

Mill Work
Schaller-Hoerr Co.

Mineral Wool
Columbia Mineral Wool Co.
U. S. Mineral Wool Co.

Miter Boxes
Goodell Mfg. Co.
Nicholls Mfg. Co.

Miter Machines
Fox Machine Co.

Miters
Fox, P. L.

Moldings
American Column Co.
Grand Rapids Wood Carving Co.
Schaller-Hoerr Co.
Waddell Mfg. Co.

Mortar Colors
French, Sam'l H. & Co.

Mortisers, Hand
Miller, Albert W., Mfg. Co.

Oil Filters
Burt Mfg. Co.

Ornamental Sheet Metal Work
Mullins, W. H. Co.

Ornamental Wire, Iron, Steel and Brass Work
Meyers, F. J. Mfg. Co.

Paint
New Jersey Zinc Co.
Standard Paint Co.

Parquette Flooring
Interior Hardwood Co.
Wood-Mosaic Flooring Co.

Patent Lawyers
Hamlin, George R.

Pencils
Dixon, Jos. Crucible Co.

Planes
Gage Tool Co.
Smith, Otis A.
Tower & Lyon Co.

Plasterers' Corner Plates
New York Steel Corner Plate. Co.

Plastic Ornaments
French, Samuel H. & Co.

Plumbers' Supplies
Karol, B. C.

Porch Columns
American Column Co.
Hartman Bros. Mfg. Co.

Reflectors
Frink, I. P.

Roofing, Art Metal Tile
Mullins, W. H. Co.

Roofing and Siding
Asphalt Ready Roofing Co.
Berger Mfg. Co.
Canton Mfg. Co.
Canton Steel Roofing Co.
Drouve, G. Co.
Eastern Granite Roofing Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Lincoln Waterproof Cloth Co.
National Roofing Co.
O. K. Harry Steel Works.
Standard Paint Co.
Stowell Mfg. Co.
Wheeling Corrugating Co.

Roofing Brackets
Stanley Rule & Level Co.

Roofing Paint
Asphalt Ready Roofing Co.
Dixon, Jos. Crucible Co.

Roofing Slate
Johnson, E. J. Co.

Sash Balances
Caldwell Mfg. Co.

Sash Chains
Bridgeport Chain Co.
Morton, Thomas.
Smith & Egge Mfg. Co.

Sash Cord
Samson Cordage Works.
Silver Lake Co.

Sash Locks
Ives, H. B. & Co.

Sash Operating Devices
Hitchings & Co.
Lord & Burnham Co.

Sash Pulleys
Grand Rapids Hardware Co.

Sashes, Doors and Blinds
Foster-Munger Co.
Lestershire Lumber & Box Co.

Saw Clamps
Cardwell, C. W., Mfg. Co.
Disston, Henry & Sons.

Saw Filing Guide
Disston, Henry & Sons.

Saw Jointers
Crescent Machine Co.

Saw Sets
Taintor Mfg. Co.

Saw Tables
Chicago Machinery Exchange.
Crescent Machine Co.
Kidder, R. E.

Saws
Disston, Henry & Sons.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
National Saw Co.
Simonds Mfg. Co.

Schools
International Correspondence Schools.

Screw Drivers
North Bros. Mfg. Co.

Sheet Metal Fronts
Mesker & Bro.

Shingles and Tiles, Metallic
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Cortright Metal Roofing Co.
Montross Metal Shingle Co.
National Sheet Metal Roofing Co.
Willis Mfg. Co.

Shingles Hip
Wheeling Corrugating Co.

Shingle Stains
Cabot, Samuel.

Shutter Worker
Mallory Mfg. Co.

Shutters (See Blinds)

Skylights
Canton Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Drouve, G. Co.
Edwards Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mullins, W. H. Co.
Willis Mfg. Co.

Speaking Tubes
Ostrander, W. R. & Co.

Spring Hinges
Bommer Bros.

Squares
Fox, P. L.
Nicholls Mfg. Co.

Squares, Combination
Hight, A. W.

Steel Figures and Letters
Sackman, F. A.

Stoves and Ranges
Boynton Furnace Co.

Structural Iron and Steel Works
Boston Bolt Co.

Structural Slate
Johnson, E. J. Co.

Tanks, Steel
O. K. Harry Steel Works

Tiling
Ostendorf, W. H.
Star Encaustic Tile Co.

Tool Boxes
Walter's Sons, W. P.

Tool Cabinets
Hammacher, Schlemmer & Co.

Tool Chests
Jennings, C. E. Co.

Tools
Forest City Bit & Tool Co.
Gage Tool Co.
Hammacher, Schlemmer & Co
Jennings, C. E. Co.
Millers Falls Co.
North Bros. Mfg. Co.
Progressive Mfg. Co.
Reed & Auerbacher Co.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S., Co.
Strelinger, C. A., Co.
Tower & Lyon Co.
Walter's Sons, Wm. P.
Wilkinson, A. J., & Co.

Turned, Molded Carved Work
Waddell Mfg. Co.

Ventilating Attachment
Drouve, G., Co.

Ventilators
Globe Ventilator Co.

Veranda Stock
American Column Co.

Vises
Hammacher, Schlemmer & Co.

Wagon Jacks
Batavia Clamp Co.

Wall Ties, Wire
C. A. Mfg. Co.

Wax, Finishing and Polishing
Johnson, S. C., & Son.

Weather Strips
Hammacher, Schlemmer & Co
King Mfg. Co.

Window Apparatus
Drouve, G. Co.

Windowand Door Stops
King Mfg. Co.

Window Fasteners
Stanley Works.

Window Stop Adjusters
Ives, Hobart B., & Co.

Window Trimmings
Caldwell Mfg. Co.

Windows, Fireproof
Mullins, W. H. Co.

Wire Wall Ties
C. A. Mfg. Co.

Wood Carving
Grand Rapids Wood Carving Co.

Wood Mantels
(See Mantels)

Wood Ornaments
Waddell Mfg. Co.

Wood Trimmers
Fox Machine Co.

Wood Working
Lestershire Lumber & Box Co.

Wood Working Machinery
American Wood Working Mach'y Co.
Barnes, W. F. & John.
Barnes Tool Co.
Chicago Machinery Exchange
Cordesman, Meyer & Co.
Cordesman-Rectin Co.
Fay, J. A. & Egan Co.
Fox Machine Co.
Kidder, R. E.
Long Island Machinery Co.
Marston, J. M. & Co.
Parks Ball Bearing Machinery Co.
Seneca Falls Mfg. Co.

Wood Working Machinery, Second Hand
Long Island Machine Co.

FACTS AND FIGURES

5,000

"Little Giant" Floor Scrapers

NOW IN USE

ARE YOU USING ONE?

FOR OAK
MAPLE
BIRCH
BEECH
YELLOW PINE
PARQUET
RUBBER
AND LINOLEUM
Floors

Scrapes every inch of floor, into corners and along baseboard

Price Complete

$65.00

F. O. B.
Chicago
or
New York

The Old Way

Two Squares in Eight Hours

One man will scrape, by hand, about two squares, or two hundred square feet of flooring, in eight hours. The wage scale for this is from 40 cents to 55 cents per hour, or from $3.20 to $4.40 for 200 square feet, which is $1.60 to $2.20 per square.

The New Way

Eight Squares in Eight Hours

One man with a "LITTLE GIANT" FLOOR SCRAPER will scrape eight squares, or 800 square feet of flooring, in eight hours, which at the wage scale of from 40 cents to 55 cents per hour, would be 40 cents to 55 cents per square.

PAYS FOR ITSELF IN A FEW DAYS

SAVING

A saving is therefore made of from $1.20 to $1.65 per square.

On 5,000 square feet (50 squares), the saving will be from $60.00 to $82.50, which at the lowest wage scale, practically pays for the machine.

We furnish one dozen knives with each machine, and they will scrape 30,000 square feet of flooring.

New knives cost $6.00 per dozen.

Sold under our guarantee to do better, faster and cheaper work than any other method.

MANUFACTURED BY THE

HURLEY MACHINE COMPANY

General Offices & Works, 153-159 S. JEFFERSON ST., CHICAGO, U.S.A.

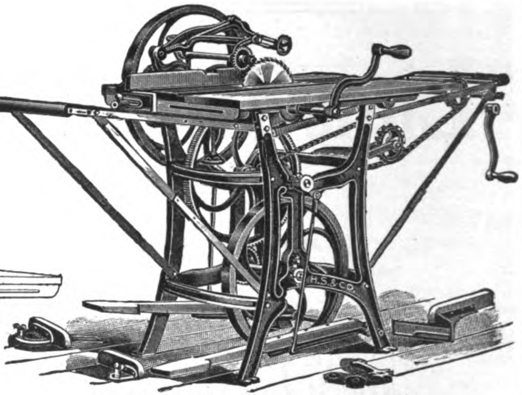
New York, FLAT IRON BUILDING SAN FRANCISCO

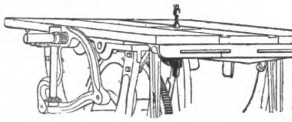
One Man with the No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw

can do the work of four men using hand tools, can do it with ease, can do it better. Consider the amount saved—three men's wages—and compare with the cost of the "Union" saw. In a short time the machine will pay for itself and then the wages saved will go into your pocket.

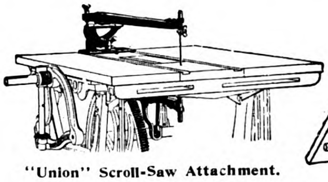
EVERY MACHINE is carefully tested before leaving factory. We guarantee entire satisfaction and machine may be returned at our expense if, after two weeks' trial, you prefer your money back.

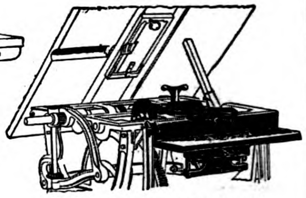
SUITABLE FOR various kinds of work—ripping (up to 3½ inches thick), cross-cutting, mitering, etc., and with additional attachments, rabbeting, grooving, dadoing, boring, scroll-sawing, edge moulding, beading, etc., almost a complete workshop in one machine.


No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw.


"Union" Moulding Attachment.

Ask for Catalog "A" fully describing our complete line of wood working machinery.


"Union" Scroll-Saw Attachment.


"Union" Boring Attachment.

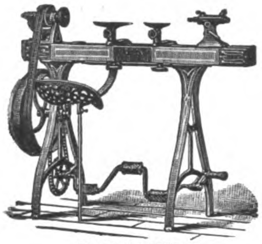
The Seneca Falls Mfg. Co.,

209 Water Street, Seneca Falls, N. Y., U. S. A.

(117)

HAND POWER FOOT

WOOD-WORKING MACHINERY.


No. 3 LATHE.

A Complete Line for a Carpenter and Builder.


Tenoner.

Our Machines are so constructed that you can take them to the house you are building.

. . . Saves Time


No. 2 SCROLL SAW.


No. 7 SCROLL SAW.

Any of our machines will pay for themselves in a year and often in a single job.

Why buy these Machines? BECAUSE

You can save a mill man's profit.
You can make more money with less capital invested.
You can manufacture in as good style and finish, and at lower cost than the mill.
You can work up stuff ahead in winter for the spring rush in building
10,000 builders are using from one to eight of our different machines.

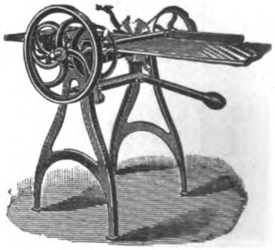
Our machines are not complicated, but simple, strong, practical and built for good hard work.


FORMER.


No. 4 SAW.

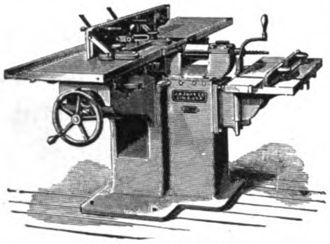

MORTISER

Send for Catalogue and Prices.


HAND RIPSAW.

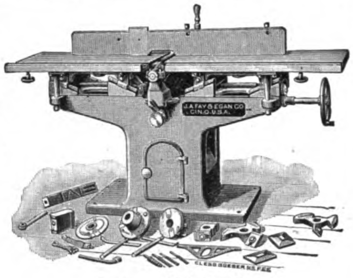
W. F. & JOHN BARNES CO., 71 RUBY ST. ROCKFORD, ILL.

Universal Wood Worker


Boring and Routing Side.

EVERY CARPENTER and **BUILDER** should have this machine because it will do a variety of work quicker and better than it can be done by hand and takes the place of several tools. It planes out of wind, surfaces, rabbets, joints, bevels, gains, champers, plows, makes glue joints, squares up bed posts, table legs, etc., raises panels, rips, cross cuts, tenons, bores, routs, etc., etc.

Ask for circular giving complete details.

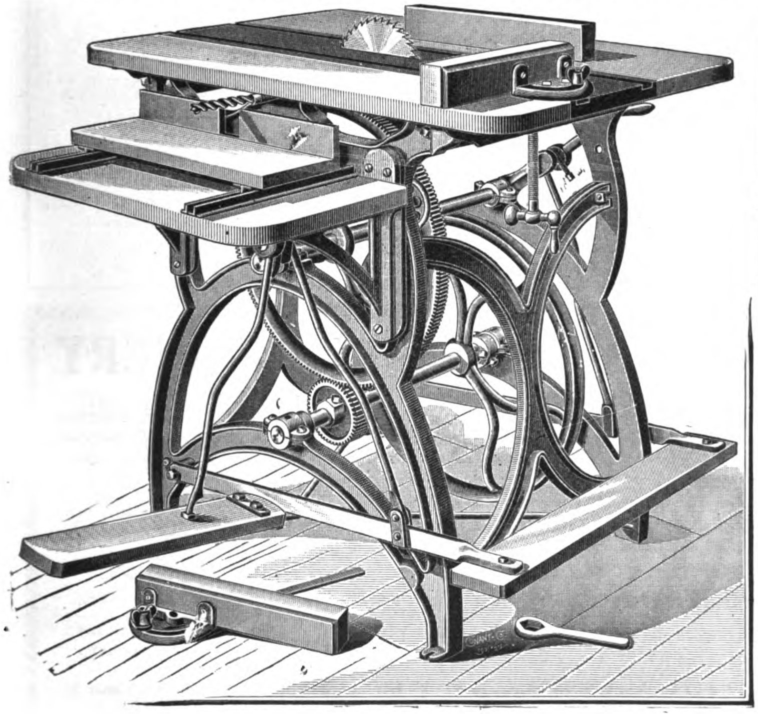

Planing and Jointing Side.

221-241 W. Front St.
Cincinnati, Ohio, U.S.A.

J. A. FAY & EGAN CO.

The World's Standard for Woodworking Machinery.

Marston's Hand and Foot Power Circular Saw.



Iron frame, 36 inches high.

Center part of top is made of iron accurately planed, with grooves on each side of saw for gauges to slide in.

Steel shafts and best babbitt metal boxes.

Gears are all machine-cut from solid iron.

Boring table and side treadle.

Two 7-inch saws and two crank handles with each machine.

Weight complete, 350 pounds.

Send for catalogue.

J. M. MARSTON & CO., 201 Ruggles St., Boston, Mass.

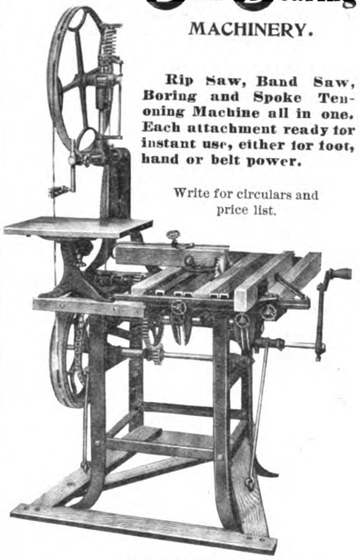
VANDORN IRON WORKS CO
CLEVELAND, OHIO.
STRUCTURAL STEEL & ORNAMENTAL IRON WORK.
JAIL WORK, JOIST HANGERS, IRON FENCINGS.

Ball Bearing

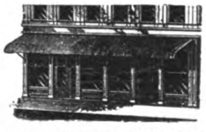
MACHINERY.

Rip Saw, Band Saw, Boring and Spoke Tenoning Machine all in one. Each attachment ready for instant use, either for foot, hand or belt power.

Write for circulars and price list.



Manufactured by
Parks Ball Bearing Machine Co.
Sta. A. CINCINNATI, OHIO.


Harry's Patent Adjustable Steel Drop Awnings.

Harry's Underground Corrugated Galvanized Steel Cisterns and Tanks

Roofing of all kinds, Fencing, etc. Send for catalogue, prices, etc.

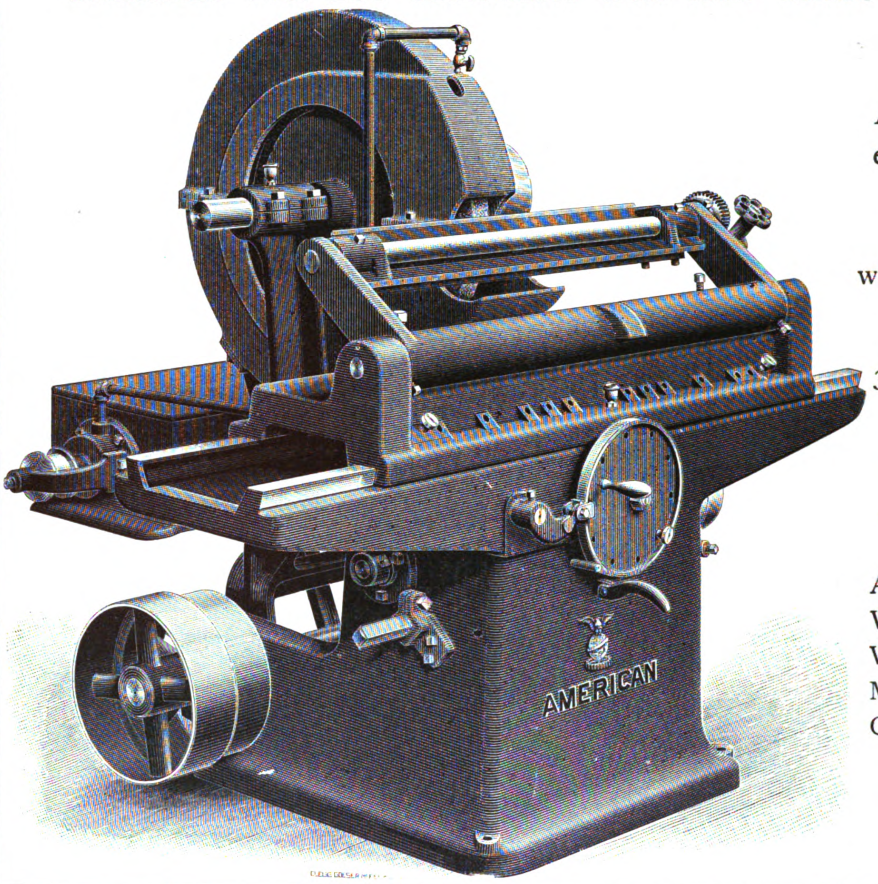
O.K. Harry Steel Works, 2341 Papin St., St. Louis, Mo.

MARK YOUR TOOLS WITH A STEEL STAMP.

SEND FOR PRICE-LIST No. 7

VERANDA.—An open air enclosure often used as a spoon holder.
VEST.—A waistcoat sold at half price.
VULGARITY.—The conduct of others.
—*The Foolish Dictionary.*

American No. 200 Automatic Self-feed Knife Grinder

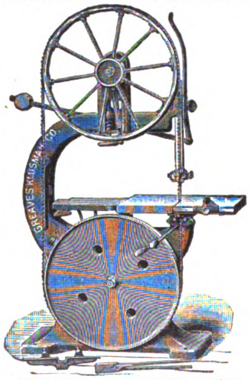


Strictly
Automatic in
every feature.
Just set it
and it
will do the rest.

Four sizes,
30 in., 36 in.,
42 in.
and 50 in.

AMERICAN
WOOD
WORKING
MACHINERY
COMPANY

New York
Chicago
New Orleans



NEW PATENT 36-INCH BAND
SAWING MACHINE.

WOOD WORKING MACHINERY
FOR
Carpenters and Builders

Don't fail to visit our exhibit when in Chicago.
Machinery of all descriptions for your inspection.

UP TO DATE MACHINERY
For the Progressive Carpenter

Write for prices on rebuilt
MACHINERY

IMPROVED HAND PLANER AND JOINTER.

Tables over 7 feet long and have steel lips.
Cylinder Slotted to receive moulding bits and other irregular knives.
Cylinder has three Bearings, one of which is outside of pulley.

CHICAGO MACHINERY EXCHANGE, 13-15 No. Canal St., CHICAGO, ILL.

LONG ISLAND MACHINERY CO.

New and Second-hand Wood Working Machinery Bought, Sold and Exchanged

ENTIRE PLANTS BOUGHT AND EQUIPPED

Junction Kent and Washington Avenues, BROOKLYN, N. Y.

GRINNELL'S ESTIMATOR
AND BUILDERS' POCKET COMPANION

Guaranteed to give satisfaction or money refunded. A handbook for Contractors, Masons, Carpenters and Painters. Treats on all branches of building from excavating to finishing. The speediest thing out. Can figure any ordinary building in fifteen minutes. The young mechanic who wishes to become a contractor can figure as accurately as the experienced Builder. Send money order for $1.00 to **GRINNELL PUBLISHING CO., 213C Law Exchange Building, BUFFALO, N. Y.**, and remember, if not satisfactory your money will be refunded.

House Hints

FOR THOSE WHO BUILD, BUY, IMPROVE OR RENT.

Sets forth many things for your careful consideration, beginning with the choice of site and taking up constructional features, house fittings and furnishing.

Second edition, enlarged. A pamphlet of 55 pages. Size 6 x 9 inches.

FIFTY CENTS, POSTPAID

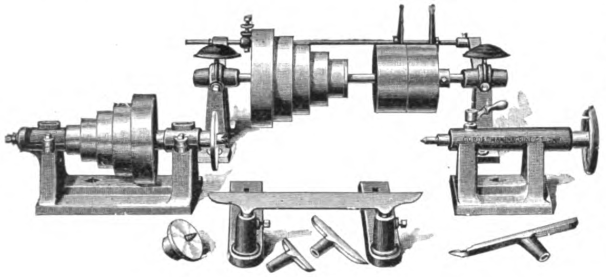
DAVID WILLIAMS COMPANY
14-16 Park Place, New York.

Digitized by Google

Original from
UNIVERSITY OF MICHIGAN

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

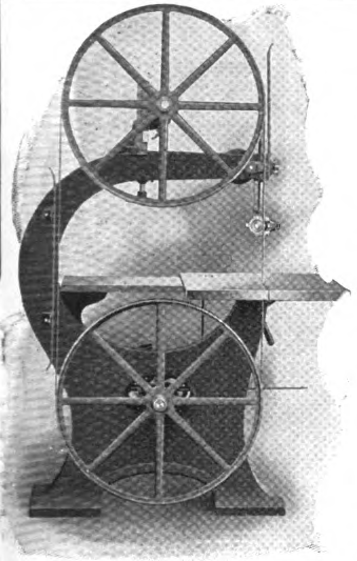
HIGH GRADE WOOD TURNING LATHES



Uncle Sam buys Cordesman-Rechtin Wood Lathes—because they are convenient, substantial and durable machines capable of the hardest kind of turning at high speed. Because they prove a credit to his shops and are just as Cordesman-Rechtin represents them. Therefore, why should you not follow his good example?

If you are in need of a good planer or anything else in the wood working machine line we have some interesting information for you.

THE CORDESMAN=RECHTIN CO.
CINCINNATI, OHIO



The Rigid Construction and Modern Design of the New 36=inch CRESCENT BAND SAW insure a machine of the very highest efficiency as a rapid producer of accurate work.

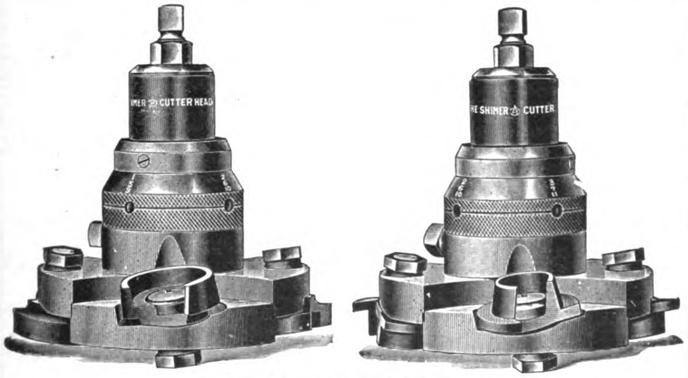
CRESCENT machines cost less than others of equal merit.

They are best because they are strong, durable and practical.

They are low in price because they are in big demand and we have to build them in large quantities.

Send at once for catalogue describing our complete line of BAND SAWS, SAW TABLES and JOINTERS.

THE CRESCENT MACHINE COMPANY, 206 Main Street,
Leetonia, Ohio, U.S.A.



Best of All, Fig. 202 and Fig. 203.

The Shimer Cutter Head

For Flooring, Ceiling, Siding, Ship Lap, Jointing, Double Ceiling, Doors, Sashes, Blinds, Etc. Special Tools for Special Service.

Should appeal to every user of a matching, moulding or tenoning machine because it does **more and better** work than any others and requires less labor and expense to keep it in order.

We make it of every size and style to fit any machine and send on trial thirty days to **responsible lumbermen.**

Send for our Catalogue and Pattern Book. It gives illustrations and complete description of a **number of these tools,** some of which will be of advantage to you.

SAMUEL J. SHIMER & SONS, MILTON, PENNSYLVANIA

How Carpenters Can Advance

Harvey Brakeman

There are hundreds of carpenters drudging along today in poorly paid positions, who could greatly better themselves by the mere stroke of a pencil if they would but muster up enough determination. The following story well illustrates this fact:

Harvey Brakeman, of New Kensington, Pa., was a carpenter earning $2 a day when he first joined the I. C. S. The instruction he received enabled him to become an architect in business for himself, and he now earns about $5,000 a year.

Mr. Brakeman says: "I think there is no better system in existence than the I. C. S. by which any ambitious carpenter can gain advancement."

Would **YOU** like to secure a better position, increased earnings, and a successful future? Are you willing to investigate the surest, quickest, easiest, and cheapest way in the world to do this? Then mark and mail the coupon below. This much costs you nothing. **DO IT NOW.**

INTERNATIONAL CORRESPONDENCE SCHOOLS

Box 969, SCRANTON, PA.

Please explain, without further obligation on my part, how I can qualify for a larger salary in the position before which I have marked **X**.

Architect
Architectural Drafts.
Building Inspector
Contractor & Builder
Structural Engineer
Structural Drafts.
Mechanical Engineer
Mech. Draftsman
Machine Designer
Electrical Engineer
Municipal Engineer
Chemist
Sheet-Metal Drafts.
Sanitary Engineer
Foreman Plumber
Electrician
Steam Engineer
Marine Engineer
Surveyor
Textile Expert
Bookkeeper
Stenographer
Ad Writer
French } With
German } Edison
Spanish } Phon'gr'ph

Name ________________

St. & No. ________________

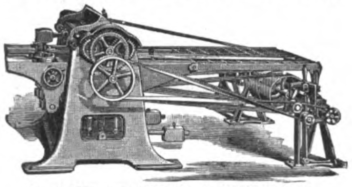
City ________ *State* ________

CORDESMAN, MEYER & CO., 26, 28 and 30 Central Avenue

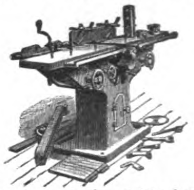
CINCINNATI, OHIO.

Manufacturers of Latest Improved

Wood-Working Machinery

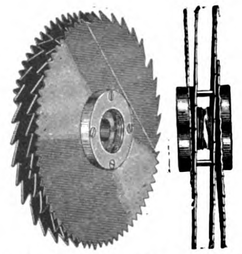


No. 2 Planer, Matcher and Moulder.



Universal Wood-Worker.

FOX



Adjustable Saw Dado Heads
The best thing for cutting grooves.

Fox Foot Power Miter Machines
The best thing for mitering mouldings and similar work.

We also make

Universal Trimmers,
Boring Machines, Lathes,
Planers, etc.

FOX MACHINE CO.
387 N. Front St., Grand Rapids, Mich

A NEW BOOK

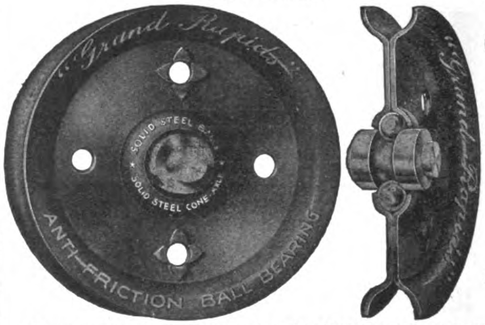
Concrete-Block Manufacture Processes and Machines

By H. H. RICE

152 Pages 46 Half-tone Cuts
Bound in Cloth
Price $2.00 Postpaid

DAVID WILLIAMS COMPANY
14-16 Park Place - - - - NEW YORK

PATENT PENDING.



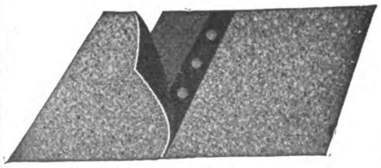
"Ball-Bearing" Grand Rapids All-Steel Sash Pulleys

Are sold DIRECT to
BUILDERS,
CONTRACTORS
and MILLS,
At prices under the common ordinary goods.

If you make ten or ten thousand window frames, we can save you money and give you a superior sash pulley. We are the largest sash-pulley makers in the world. We ship direct, or through dealers and jobbers everywhere.
Write for catalogue and free samples and prices on half-gross, gross, barrel or any quantity.

Direct from the Makers to you. Inquiries welcome.

GRAND RAPIDS HARDWARE CO.,
PEARL STREET - - - GRAND RAPIDS, MICH.



"Security Roofing"

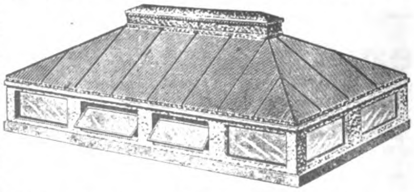
(Reg. U. S. Patent Office)
Has a patent six joint with no nails driven through the top sheet.
Made to be laid and then forgotten.
Beware of Infringements.
NATIONAL ROOFING CO., Tonawanda, N. Y.

PLUMBERS' SUPPLIES AT WHOLESALE.

If you need anything in my line, and wish to **SAVE 20 to 40 Per Cent** on every article, write for my free illustrated Catalog. Shipments promptly made from a very complete stock of guaranteed goods. Small orders are as carefully handled as large ones.

B. C. KAROL, 235 W. Harrison St., Chicago, Ill.

CORNICE, SKYLIGHTS, FINIALS



VENTILATORS
CONDUCTOR PIPE
METAL WINDOWS
METAL CEILINGS

Cat. on application.

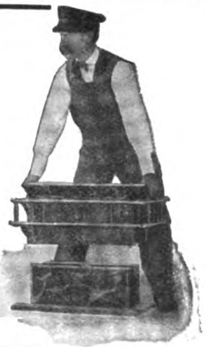
The Canton Manufacturing Co., - Canton, Ohio

STORE ELEVATOR FOR $105

COMPLETE, READY TO ERECT, MADE BY THE HUNDRED. SIMPLE IN CONSTRUCTION. EASILY CARED FOR. OTHER STYLES AND PRICES TO SUIT.

The Warner Elevator Mfg. Co.
2100 Valley St., CINCINNATI, O.
NEW YORK OFFICE: 2032 PARK ROW BUILDING.

Portable Hollow Concrete Block Machine



BEST—FASTEST—SIMPLEST—CHEAPEST.

MOVE THE MACHINE—NOT THE BLOCKS

Saves labor of off-bearing, avoids loss by crackage or breakage, saves expense of heavy cumbersome iron pallets. Sand, Water and Portland Cement only materials required. BIG PROFITS. Blocks cost 6 cents to make. Sell for 18 cents. Whole outfit costs $125.00.

FULLY GUARANTEED. SENT ON TRIAL.

THE PETTYJOHN CO., 616 North 6th Street, TERRE HAUTE, IND.

DEFY COMPETITION

The Ideal Concrete Machine for the manufacture of Concrete Building Blocks makes it possible to profitably undersell all other building materials in all localities.

Ideal Blocks can be sold far below the cost of brick, lumber or natural stone. Excel them all in durability and fire and weather proof qualities. Adaptable to any possible architectural design.

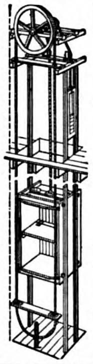
IDEAL CONCRETE MACHINERY

Wonderfully simple in construction. No chains, springs or gears. Embody the only principle (face down) permitting the practical use of rich facing material with less expensive material in back of blocks. Adaptable to any size block within capacity.

The same machine makes blocks in countless ornamental designs and natural stone effects.

Write and learn how easily, rapidly and profitably **one man** can turn out Concrete Building Blocks with an Ideal machine.

IDEAL CONCRETE MACHINERY CO.
Dept. O
SOUTH BEND, INDIANA



DUMB WAITERS AND HAND ELEVATORS,

Trunk Lifts,
Invalid Lifts,
Carriage Elevators,
Freight Elevators,
Sidewalk Elevators,
Hatchway Hoists.

All of most improved design and construction.

Sedgwick Machine Wks.,
88 Carroll Street,
POUGHKEEPSIE, N. Y.
New York Salesroom, 128 Liberty St.

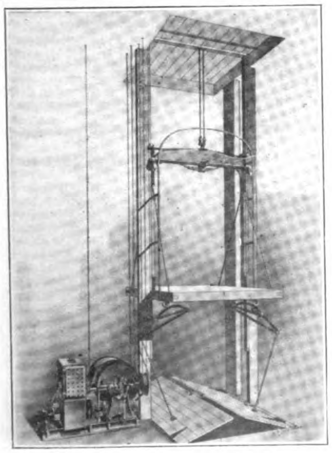
Catalogue on application.
Estimates on request.

Improved Quick and Easy Rising Steam, Electric and Hand Power Safety

ELEVATORS

AND DUMB WAITERS.
Automatic Hatch Gates.
Send for Circulars.

KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kimball Elevator Co., Cleveland, Ohio, 246 Vincent St
Branch Offices:
120 Cedar St., New York. 108 11th St., Omaha, Neb



A New Type of

Electric Freight Elevator

at a moderate price.

This elevator is considerably cheaper than our standard direct electric machine and costs but little more than our belt connected machine.

CAPACITIES:

2500 lbs. at 55 feet per minute
(Without trap-doors)
2000 lbs. at 75 feet per minute
1500 lbs. at 100 feet per minute

Steel worm, bronze rimmed gear wheel. Ball bearing end thrusts.

Motor of our own make especially designed for elevator service, compound wound, slotted armature core.

If interested in elevators write us.

MORSE, WILLIAMS & CO.
Dept. of Otis Elevator Co.
PHILADELPHIA ATLANTA BOSTON

ELEVATORS AND DUMBWAITERS

that can be placed in position by any carpenter.
Catalogue Free.

Energy Elevator Co.
407 Cherry St., - Phila., Pa.

ALL KINDS OF ELEVATOR CARS AND ENCLOSURES

Bank and Office Railing.

Send for Catalog.

FRED J. MEYERS MFG. CO.
HAMILTON, OHIO

"AMERICAN"
Polygon Conductor Pipe

Can be furnished in either Galvanized Iron or Copper.
It is made from galvanized iron in 10-ft. lengths,
without a cross seam; from copper in 8-ft. lengths.

American Rolling Mill Co., MIDDLETOWN, OHIO.

ARCHITECTS! CONTRACTORS! BUILDERS!

When you want any STRUCTURAL WORK it will pay you to write to the

BOSTON BOLT COMPANY
ESTABLISHED 1872

Works, Offices and Salesroom
38-54 Farnsworth Street

Convertors of Iron and Steel into Bolts, Expansion Bolts, Nuts, and all kinds of Structural Work for Mills, Churches, Halls, Factories, Bridges, Wharves, Etc., and Iron Work of all kinds forged and made to order. *Send for catalog.*

JOHN W. CROOKS, Treasurer
BOSTON, MASS.

To Make Money From Your Invention

it must be protected by such a PATENT as will enable you to completely MONOPOLIZE it and control infringers. I procure patents that stand the test of competition at a cost probably nowhere near as high as you may think. The patent law favors the DILIGENT, not the indolent, inventor, so send me TO-DAY a sketch or model, and explanation of your invention and I will furnish full advice. To morrow, next week, or next month may be too late. References on request.

GEO. R. HAMLIN, Patent Lawyer, 800 H Street, N. W., Washington, D. C.

COPPER LIGHTNING RODS

ABSOLUTE PROTECTION from LIGHTNING is given by use of our continuous copper conductors.
E. G. Washburne & Co., 46 Cortlandt St., New York.
Telephone 3125 Cortlandt.
Work put up or material furnished.

THE IMPROVED
Hand and Foot Power **E. F. B.**

SAWING MACHINE.

For Carpenters, Builders and All Wood Workers Who Have Shops Without Power.
SEND FOR CIRCULAR.
THE BARNES TOOL CO., New Haven, Conn.

Diamond Expansion Bolt.

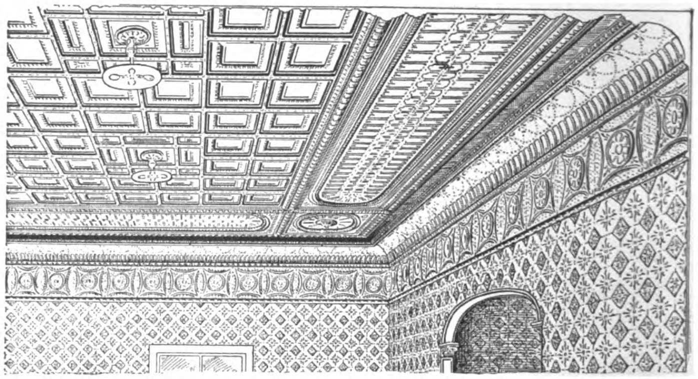
Patented
For fastening fixtures, timbers etc., to brick, stone concrete or other masonry.
DIAMOND EXPANSION BOLT CO.,
9-11-13-15 Murray Street, New York, N.Y.

Estimating!

Estimating the cost of a job safely and correctly is the most vital element of success to the contractor. Therefore he should have a copy of ***The Lightning Estimator*** for residence work, etc. Illustrated. Covers the entire field for the mason and carpenter, teaching a new practical, reliable method, showing the exact cost of each separate item of the labor and material, but so arranged that a medium priced house may be estimated in 30 to 60 minutes. For the busy builder. Is having the most phenomenal sale and splendid endorsement of any book of its kind ever put upon the market.

In class by itself. Prepared by a builder of experience from actual building construction, not theory. Large sales permit us to sell the book for 60 cents. (Money order.) You cannot afford to wait. Write now.

BRADT PUB. CO.,
260 Michigan Avenue, JACKSON, MICH.



THE KINNEAR

LOCK-JOINT STEEL CEILING, Etc.

Has no equal. Try it and be convinced. Prices reasonable.
Catalog upon request. Send measurements for estimate.

The Kinnear & Gager Co., M'f'r's, COLUMBUS, OHIO
BOSTON, 125 Broad St.

We make Ceilings for churches, schools, stores, lodge rooms, court rooms, libraries, residences, etc.

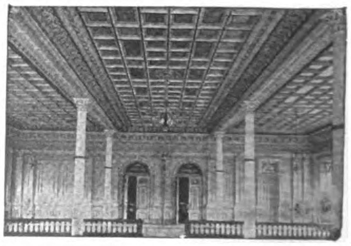
Our ceilings are shipped ready for erection. No expert labor required. Working drawings furnished. They're adapted to any kind of building. Exclusive in classified design.

Berger "CLASSIK" Steel Ceilings

We also make Steel Roofing, Siding, Metal Shingles, Architectural Sheet Metal Work and Fireproofing Material.

Our catalogues sent you free. Ask for them.

THE BERGER MFG. CO.
CANTON, OHIO.
New York. Boston. Phila. St. Louis



Dixie Metal Shingle Roofing

Modern Suburban Residence Roofed—With Our Dixie Metal Shingles

Fire Proof—Weather Proof
Ornamental

MANUFACTURED BY

Wheeling Corrugating Co.

WHEELING, WEST VIRGINIA.

Dixie Metal shingles are made of the best quality full weight roofing plates, carefully painted on both sides with the best iron oxide paint mixed with pure linseed oil. The color is dark red.

Galvanized shingles are galvanized after being formed, thereby leaving no raw edges.

The sidelock is perfect. Contraction and expansion is provided for. No solder is used.

The deep overlap makes a storm proof roof. Light in weight.

Not Expensive

WRITE FOR PRICES

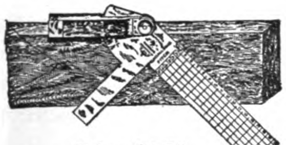
Any Handy Mechanic Can Apply Our Metal Shingles.

BRANCH OFFICES AND WAREHOUSES:

New York City - - -	47-51 Cliff Street
Chicago - - -	23-27 N. Clinton Street
St. Louis - -	112, 114, 116 So. Eighth Street
Philadelphia - -	402, 404, 406 Race Street
Boston, Mass. - -	132 and 134 Pearl Street
Chattanooga, Tenn. - - -	King Street

Large Stocks of all our Products are Carried at the Factory and in all the Warehouses.

TOPP'S FRAMING TOOL.



Price, $1.75

A PERFECT TOOL and the only Tool for the purpose ever invented.

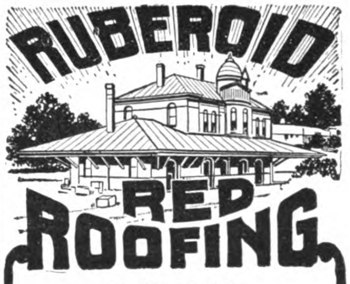
Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

Write for booklet. Address the manufacturers,

G. A. TOPP & CO., - Indianapolis, Ind.

SECURE
PROTECTION AND LONG
SERVICE BY USING OUR
ASPHALT ROOFING
SAVES REPAIRS
SAVES RECOATING
SAVES RENEWING
Send for Samples and Pamphlet
STOWELL MFG. CO.
JERSEY CITY, N.J.



PAT. NOV. 22, 1904.

FOR 15 YEARS

RUBEROID HAS BEEN RECOGNIZED AS THE STANDARD PREPARED ROOFING. AS NOW MADE IN COLORS, RED AND BROWN, IT ENSURES YOU

A PERMANENT ROOFING WITH A PERMANENT COLOR.

A COMBINATION OF BEAUTY AND WEATHER AND FIRE PROTECTION. ANY HANDY MAN CAN APPLY IT.

SEND FOR SAMPLES.

THE STANDARD PAINT COMPANY,
Sole Manufacturers,
100 William Street, New York.

RUBEROID is the only prepared roofing which can truthfully be said to outlast metal and shingles, Costs less. easier to apply, requires less attention. Makes a sound. seam-tight roof, flat or sloping, unaffected by expansion or contraction, and suitable for poultry house, barn or handsome residence.

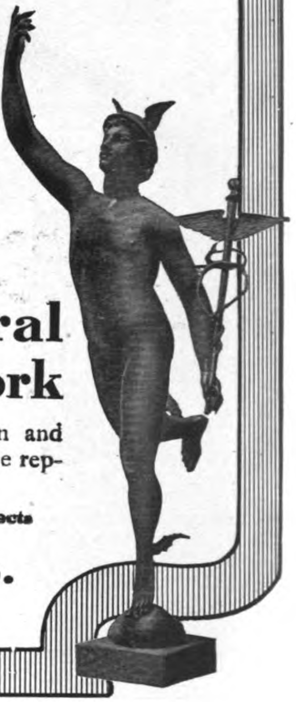
RUBEROID contains no tar, paper, rubber or other short-lived ingredients to crack, dry up and become useless with age. Made from the finest wool felt, saturated with a patented water-proof and fire-resisting compound. Retains its elasticity and flexibility indefinitely.

Any handy man can apply it. Full instructions and fixtures free with every roll. Let us tell you more about Ruberoid. Write for samples and booklet

THE STANDARD PAINT COMPANY,
SOLE MANUFACTURERS,
100 William St., New York.
Chicago, Cincinnati, St. Louis.

We Give Particular Attention To Special Designs

and are fully equipped to execute the most intricate and delicate work ever attempted in sheet metal.



Mullins
Art Architectural Sheet Metal Work

is far in advance in architectural design and artistic execution and has won an enviable reputation for excellence.

Estimates, Designs, etc., submitted to architects builders and contractors on request.

The W. H. Mullins Co.
208 Franklin St., Salem, Ohio.
(Everything in sheet metal.)

CORTRIGHT
METAL SHINGLES

Carpenters: Who is going to lay the roof of the building on which you are working? If you're not, stop and think a minute, couldn't you do it? Certainly if it's a Cortright Shingle roof you could, and you ought to, because you'd make money and make it easily. Let us tell you why.

WANTED: A thousand carpenters that are dissatisfied with their present wages and want to make money easily, write to

CORTRIGHT METAL ROOFING CO.
PHILADELPHIA CHICAGO

A METAL SHINGLE ROOF
"THE EDWARDS KIND"

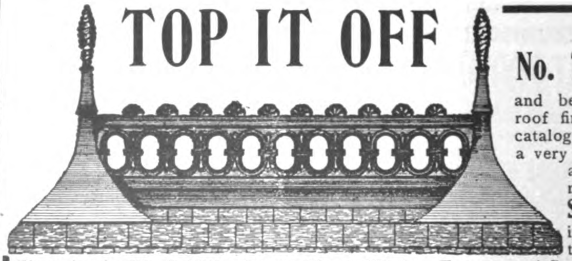
A guaranteed protection against fire and the elements, taking a very low rate of insurance. Made of best grade Worcester Terne Tin, Painted or Galvanized, in sizes 7 x 10, 10 x 14, 14 x 20 inches.

Write for Descriptive "Shingle Booklet" and Prices.

THE EDWARDS MANUFACTURING CO., "THE SHEET METAL FOLKS"
423 to 443 Eggleston Ave., Cincinnati, O.
Manufacturers of the most extensive line of SHEET METAL Building Material in the world

---

TOP IT OFF



With our

No. 76 Cresting

and be proud of your roof finish. Send for catalog No. 5 showing a very complete line of architectural metal work.

STEEL CEILING is a leading feature with us.

We make the W. H. Miller Patent Metal Window Frames and Sash. Special catalog on these. Originators of the hip shingles.

WILLIS MFG. CO., - - Galesburg, Ill.

"STAR ENCAUSTIC TILE CO.,"

MANUFACTURERS OF

Superior Unglazed Encaustic Tile

For Floors in Stores, Churches, Depots, Kitchens, Halls, Porches, &c.

Office and Factory, Bluff Street, near 61st,
PITTSBURG, PA.


Ellers
Metal
STOVE PIPE IRON.
CORNICE.
SKYLIGHTS.
EAVESTROUGH.
CONDUCTOR PIPE.
STEEL ROOFING & SIDING. SOLDER ETC.
TIN
PLATE
Ceilings
THE ELLER MFG. Co SUCCESSOR TO J.H. ELLER & Co
CANTON, OHIO.


For More Light on the Subject send for our PHOTO-PAMPHLET
PERFECTED GRANITE ROOFING

1225

VARIETIES

of

Conductor Elbows

ARE MADE BY

F. Dieckmann,

1182 Harrison Ave.

Cincinnati

O.

DO YOU WANT THE BEST

DRAWING TABLE

made? If so send for illustrated catalogue and prices.

R. E. KIDDER,

22 Hermon Street, Worcester, Mass.

Lock-Joint Metal Ceiling Is Dust Proof

Dust and dirt will not collect around the joints of a ceiling that is air-tight and dust-proof. An advantage worth considering.

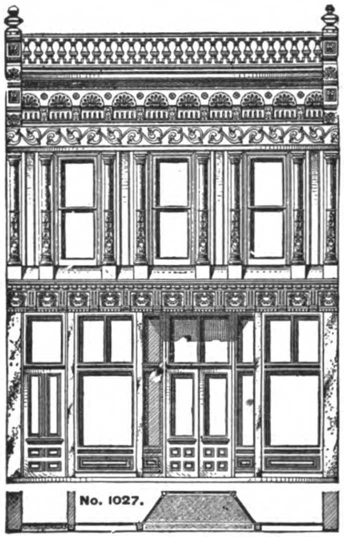
Lock-Joint saves 50 per cent. of the labor of erecting. Another good point.

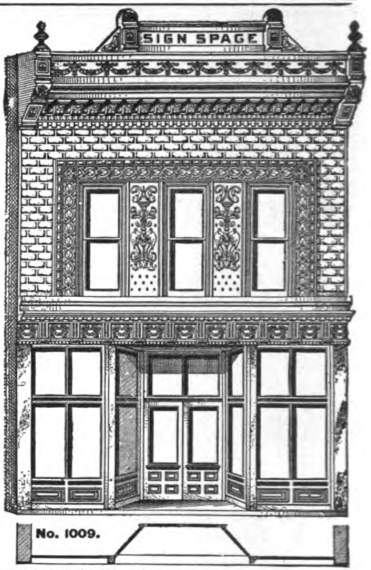
Send for Catalogue "F"

S. Keighley Metal Ceiling & Manufacturing Co.,

PITTSBURGH, PA.

Boston Washington New York Baltimore





25 feet wide—lower ceiling 12 feet in clear.

Net price F. O. B.		St. Louis, Mo.	$209.00
"	"	New York, N. Y.	238.00
"	"	St. Paul, Minn.	229.00
"	"	Denver, Colo.	268.00
"	"	Dallas, Tex.	253.00

Net price F. O. B.		St. Louis, Mo.	$187.00
"	"	New York, N. Y.	212.00
"	"	St. Paul, Minn.	204.00
"	"	Denver, Colo.	239.00
"	"	Dallas, Tex.	225.00

Galvanized Sheet Steel Fronts

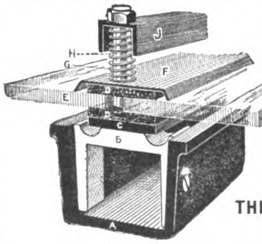
The designs presented herewith illustrate our complete and modern store fronts. The prices include the steel sill course, steel vestibule plate, steel angle columns for covering end walls, steel intermediate box columns; show sash, store doors, transoms, door posts, box window frames with sash of white pine 1¾ in. thick; all glass for same of double strength; galvanized iron work above first-story columns.

We make and ship over 800 fronts annually from 20 to 300 feet in width and from one to five stories high. Having given the manufacture of complete fronts our most careful study for over thirty years, they are now the best, cheapest and most elaborate in the market. Owing to their simple and practical construction, any mechanic, whether experienced in this particular line or not, can erect them, aided by a set of full-size details and instructions that we furnish. We desire to introduce this class of work in every city in the United States, and solicit the correspondence of architects, builders and others contemplating the erection of buildings. Send for references, full descriptive catalogue and discounts. **Established 1846.**

MESKER & BROTHER,

421-519 S. SIXTH STREET - - - ST. LOUIS, MO. U. S. A.

THE "ANTI-PLUVIUS" SKYLIGHT



Absolutely and permanently impervious to rain, snow, sleet or dust without putty or cement. With bridge arrangement for walking on the skylight without danger of breaking the glass. Specially adapted for large buildings and shops where there is always more or less vibration.

A—Steel Supporting Bar.
B—Mall. Iron Bridge.
C—Flat Iron.
D—Felt.
E—Glass.
F—Copper Sheet Cap
G—Coil Galv. Brass Spring.
H—Galv. Brass Stud.
J—Bridge (for walking on skylight).

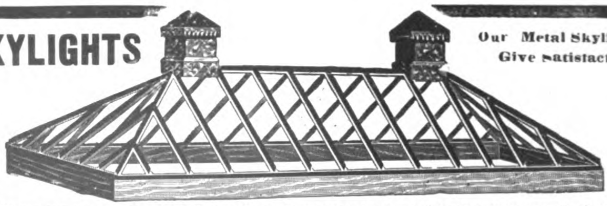
THE G. DROUVÉ CO., Bridgeport, Conn., U. S. A.

Also Manufacturers and Erectors of
THE LOVELL WINDOW OPERATING DEVICE.

Inquiries Solicited and Estimates Cheerfully Furnished.

SKYLIGHTS

Our Metal Skylights Give Satisfaction.



They are so constructed that all condensation is carried to the curb and discharged through weep holes on to the roof without soaking between laps.

The peculiar construction of the curb on our skylights renders counterflashing unnecessary.

Frames of galvanized iron or copper, with glass of any kind or thickness.

Write for our New Cornice, Skylight and Ornament Catalog.

THE CANTON STEEL ROOFING CO., Canton, Ohio

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

Digitized by Google

Original from
UNIVERSITY OF MICHIGAN

BUY . . . .
LUMBER
DIRECT

WE MANUFACTURE ALL KINDS.—MOULDINGS, WINDOWS, DOORS, BLINDS. MIXED CARS, INCLUDING EVERYTHING FOR A BUILDING. STRAIGHT CAR-LOADS SHINGLES, SIDING, FLOORING, WHITE PINE, AT WHOLESALE PRICE.

"Our complete Catalog and Price List of all kinds of Building Material would be a great help to you in figuring."

LESTERSHIRE LUMBER & BOX CO., LESTERSHIRE & BINGHAMTON, NEW YORK.

THE brightest, smoothest and handsomest finished woodwork will not please your eye better than your own work finished with

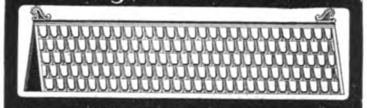
FRENCH'S ELASTIC FINISHES Interior and Exterior.

Made to withstand hardest use.

Samuel H. French & CO., Varnish and Paint Manufacturers
Established 1844. York Ave., 4th & Callowhill Sts., Philadelphia, Pa.

WALTERS'

Shingles that last



Made from Galvanized Tin and Painted Tin
STORM, RUST AND FIRE PROOF
Do you want to increase your business? THIS IS YOUR OPPORTUNITY. Write for catalogue, samples and prices.
National Sheet Metal Roofing Co.,
JERSEY CITY, N. J.

THE "GLOBE" VENTILATOR

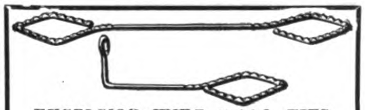
In Brass, Copper, Galvanized Iron and with Glass Tops for Skylight Purposes. Also

"Globe Ventilated Ridging"

For Barns, Residences and Buildings of every character. Far superior to a Cupola.

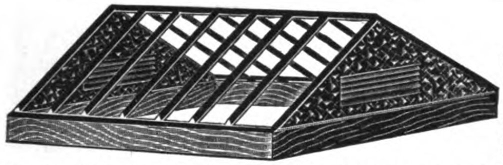
Send for Description and Price List.

Manufactured by **GLOBE VENTILATOR CO.** Troy, N.Y.



EXCELSIOR WIRE WALL TIES
Galvanized steel wire. Strong and reliable. In use everywhere. Samples free. Order of your dealer. Agents Wanted. C. A. Mfg. Co., La Salle, Illinois

---



ART METAL CEILINGS

Exclusive and Artistic Designs appropriate for any style of architecture.

All Styles Galvanized and Copper Skylights, Cornices, Finials, Crestings, Ventilators, Metal Shingles, Roof Gutters, all styles painted and galvanized Iron Roofing and Siding, etc. Write for Catalogue and Prices. Estimates free.

Kanneberg Roofing & Ceiling Co.,
Manufacturers,
CANTON, OHIO.

THE NEW YORK STEEL CORNER PLATE CO.
—SUPPLY—
The Parker Steel Corner Bead for the Protection of Plastered Corners
Outlines a perfect corner. The best Corner Bead in the market. Fits any ground.
Endorsed by Leading Architects, Builders and Plasterers.
Telephone 876 Madison Square.
All communications to 1135 B'way, N. Y. C.

THE NEW BOOK

"Strength of Beams, Floors and Roofs"

Makes easy the Designing and Figuring of Wooden Beams and Trusses.

TWO DOLLARS, PREPAID.

DAVID WILLIAMS COMPANY, Publishers, 14-16 Park Place, New York.

Selected Books For Carpenters

Hicks' Builders' Guide	$1.00
Meloy's Progressive Carpentry	1.00
Sylvester's Modern Carpentry and Building	1.50
Kidder's Building Construction and Superintendence, Volume 2—Carpenter's Work	4.00
Hodgson's Practical Uses of the Steel Square, Volumes 1 and 2, each	1.00
Hodgson's Modern Carpentry and Joinery	1.00
Shawver's Plank Frame Barn Construction	0.50
Stoddard's Steel Square Pocket Book	0.50
People's Pocket Stair Builder and Carpenter's Handbook	2.50
Maginnis' How to Measure Up Wood-Work for Buildings	0.50
Hodgson's Up-To-Date Hardwood Finisher	1.00
Maire's The Modern Wood Finisher	0.50
Easy Lessons in Roof Measurements	0.25
How to Become a Good Mechanic	0.25

Our Descriptive List of books for the Building Trades sent on request.

David Williams Company
14-16 Park Place, New York.

LOOK OVER THE SIMONDS SAWS, and you will see the points of advantage.

FIRSTLY, they are ground a true taper, which enables the user to run the Saw with very little Set.
SECONDLY, each Simonds Saw is handled by a mechanic who thoroughly understands the hanging of the Saw, which guarantees this most important feature.
THIRDLY, the filing and setting of the Simonds Saws are carefully done, and thoroughly inspected, so that the Saws, on leaving the factory, are ready for work.
FOURTHLY, the steel used in the manufacture of the Simonds Saws is a high carbon crucible steel, and will hold its cutting edge much longer than the ordinary steel generally used.
FIFTHLY, each Saw is put up in a separate case, thus avoiding fingering and rust marks commonly found on Saws that are not encased properly.
SIXTHLY, because every Simonds Saw is guaranteed thoroughly.

Any mechanic trying a Simonds Saw, and not finding same satisfactory, may return the Saw, either to the dealer or to the Simonds Mfg Co., and get either a new Saw or money paid back.

SEND FOR CATALOGUE AND PRICE LIST.

SIMONDS MFG. CO.,
Fitchburg, Mass. Chicago, Ill. New York, N.Y.
Portland, Ore. Seattle, Wash.
SIMONDS MFG. CO., Ltd., New Orleans, La.
SIMONDS SAW CO., San Francisco, Cal.

STANDARD MINERAL WOOL

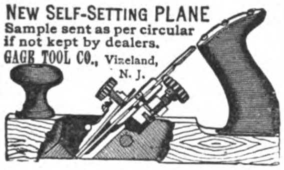
LOOKING ALL WAYS FOR BUSINESS
COLUMBIA MINERAL WOOL CO.,
Room 918, 112 Clark St., CHICAGO.
Samples and Circulars Free

Fireplace Mantels
MADE OF
Ornamental Brick
$12 and up.

Last longest—look best—are not too costly. There's no other kind so good—so pleasing. Our Sketch Book tells all about them. Write for it.

PHILA. & BOSTON FACE BRICK CO. - P. O. Box 8613 - BOSTON, MASS.

NEW SELF-SETTING PLANE
Sample sent as per circular if not kept by dealers.
GAGE TOOL CO., Vineland, N. J.



Irons warranted.
Plane is returned money refunded.

OUR FINE HARDWOOD FLOORING
SHOULD BE THE BEST.

We have been making PARQUETRY for TWENTY YEARS. We have our own saw mill and timber tracts and two factories. Send for our trade discounts and our Design Book No. 5.

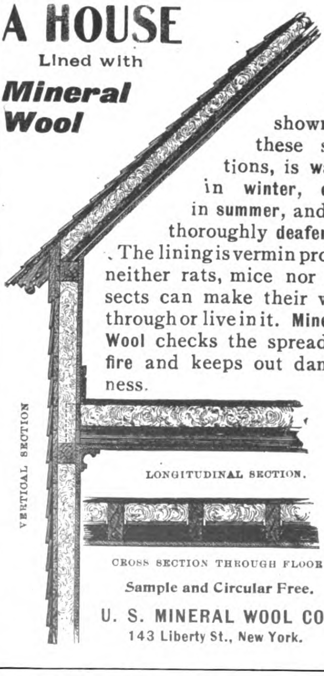
WOOD-MOSAIC FLOORING CO.
ROCHESTER, N. Y. NEW ALBANY, IND.

Bolcoa
TRADE MARK
ETCHING FLUID

Will mark your tools in a manner impossible to erase, without destroying the article itself. Protect yourself against loss and theft. Easy of application. **Price 25 cents.** We handle a full line of tools. Let us know your wants.

Reed & Auerbacher Co.
229 Bowery, N. Y.

A HOUSE
Lined with
Mineral Wool



As shown in these sections, is warm in winter, cool in summer, and is thoroughly deafened. The lining is vermin proof; neither rats, mice nor insects can make their way through or live in it. Mineral Wool checks the spread of fire and keeps out dampness.

Sample and Circular Free.
U. S. MINERAL WOOL CO.,
143 Liberty St., New York.

The Boynton Furnace Co.
SOLE MFRS. OF
Boynton's Furnaces,
Ranges,
Hot Water Heaters,
Steam Heaters, Etc.

207-9 Water Street, New York.
147-9 Lake Street, Chicago.

All Manner of Handy Rules for the Estimator are given in . . .

HODGSON'S

Estimating Frame and Brick Houses

ONE DOLLAR, POSTPAID.

DAVID WILLIAMS CO., 14-16 Park place, N. Y.

EVERY Builder who reads, investigates and progresses will have a copy of Kidder's Strength of Beams, Floors and Roofs. $2.00 prepaid.
DAVID WILLIAMS CO., 14-16 Park Place, N. Y.

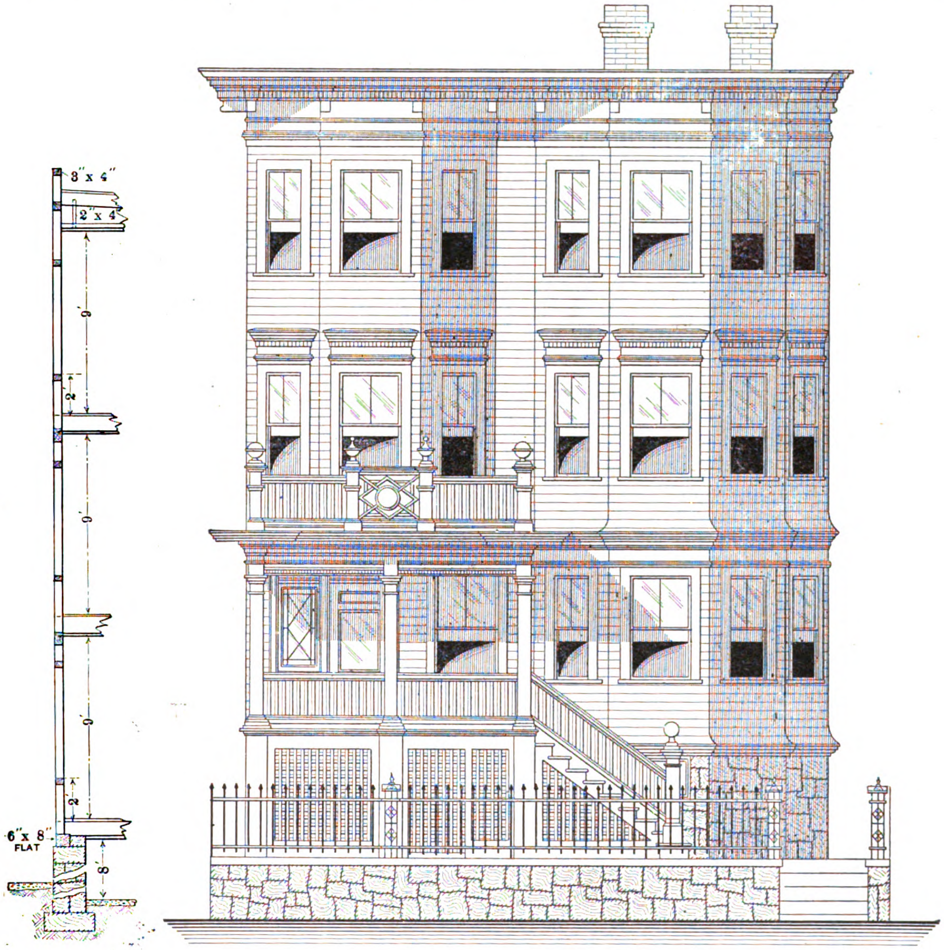
Carpentry and Building

New York, October, 1906.

A Three-Family Apartment or "Flat" House.

(*With Supplemental Plate.*)

THE tendency toward two and three family houses is becoming decidedly marked in the improvement of property in the cities and smaller towns, and operations covering large numbers of the former have been a feature of our building reports for some time past. There have, however, been comparatively few three-family houses, owing to the fact that where flats have been erected they have been designed to accommodate a large number of people and generally range from four stories in hight upward. In many localities, however, and especially in the suburban districts, there appears to exist a demand for buildings to accommodate three families only, and in this issue we present the drawings of a house of this kind recently erected in one of the outlying districts of the city of Boston. It contains some features which are not found in the general run of dwellings of its class and it will therefore likely interest a large class among our readers, especially those architects and builders who are called upon to execute work of this nature.



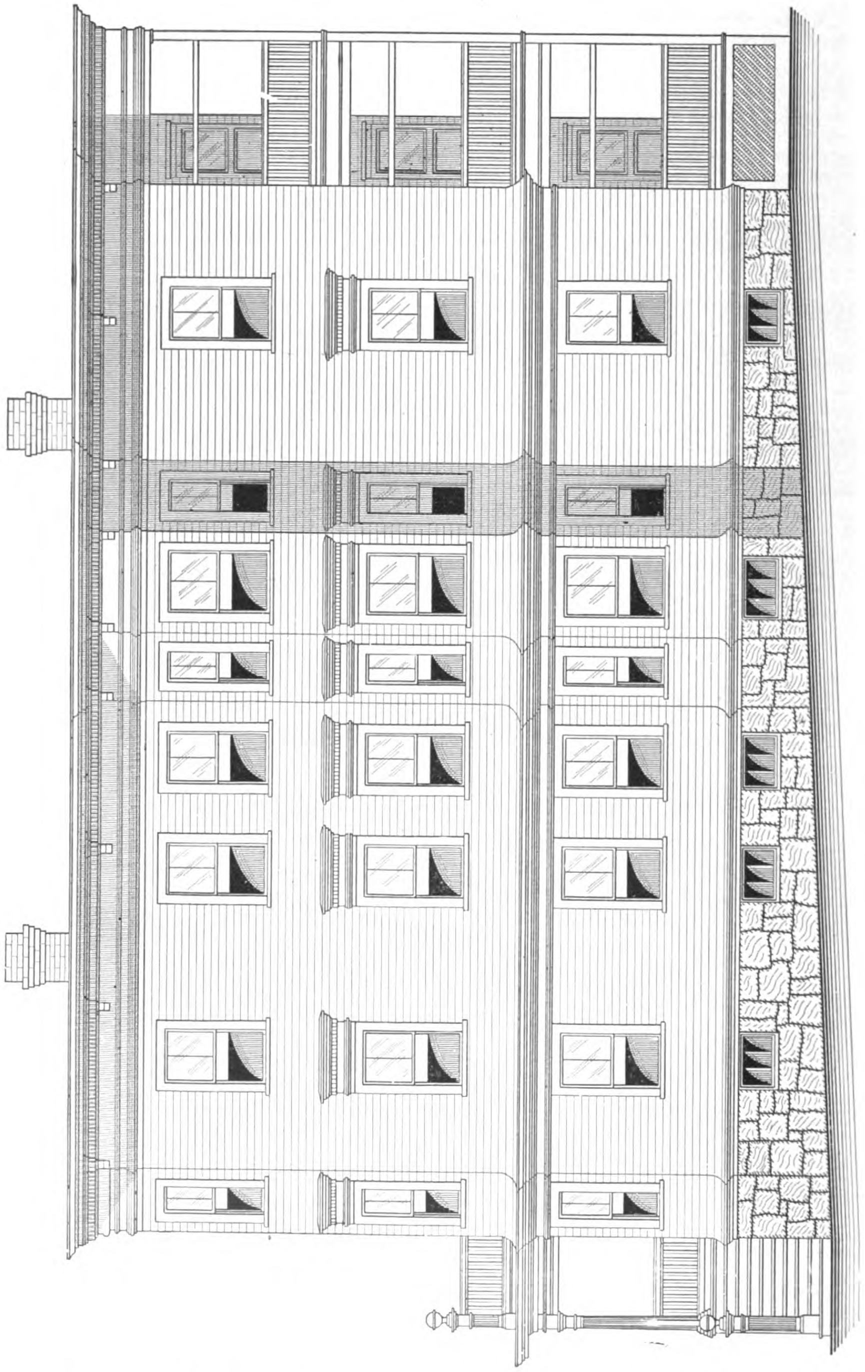
Front Elevation and Section.—Scale, 1/8 In. to the Foot.

A Three-Family Apartment or "Flat" House.—George Prescott Connor, Architect, Boston, Mass.

According to the specifications of the architect the foundation walls are of ledge stone, laid in cement mortar and with the smooth face on the cellar side. Above grade the walls are of split or sap face Quincy granite, laid in cement mortar. The cellar has a cement bottom, consisting of one part Rosendale cement, two parts clean sharp sand and five parts of broken or crushed stone which would pass through a 2-in. ring. The top coat is 3/4 in. thick, and is composed of one part Portland cement and two parts sand.

The frame of the building is of spruce, unless otherwise specified, and is fastened together with oak pins. The posts are tenoned to the sills and the girts to the posts, long braces being cut in the latter. The outside frame is covered with 7/8-in. spruce sheathing boards, over which is placed a layer of extra heavy building paper,

this in turn being covered with spruce clapboards 6 in. wide, laid 4¼ in. to the weather. Tar paper is used under all casings, finish, &c. The roof boards are covered with a heavy thickness of waterproof paper and four thicknesses of tar paper, mopped with American pitch and finished with clean beach gravel. All flashings are of zinc and all tinwork has under it a layer of heavy waterproof paper, the tin being painted on the under side before laying. The piazza columns are 10 in. in diameter, with fluted shafts, each set ¾ in. above the floor on four balls 2 in. in diameter, cut flat on the top and bottom. The joists on girders bearing partitions are crowned about ½ in., and all joists are set with the crowning side up. The sills are bedded in cement and have a coat of white lead on two sides. The floor joists are braced with ⅞ x 2½ in. cross bridging.

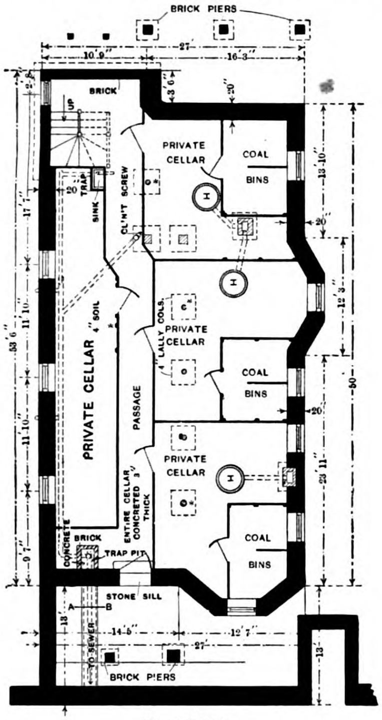


A Three-Family Apartment or "Flat" House.—Side (Right) Elevation.—Scale, ⅛ In. to the Foot.

The floors are double, the under ones being of hemlock, while the upper floors in parlors, dining rooms and sitting rooms in the first and second stories are of North Carolina pine, with a 20-in. border laid herring bone at the angles. The floors in the side chambers and rear halls are of Georgia pine, while the remainder of the floors throughout the building are of heart rift Georgia pine not over 4 in. wide. All matched flooring is blind nailed.

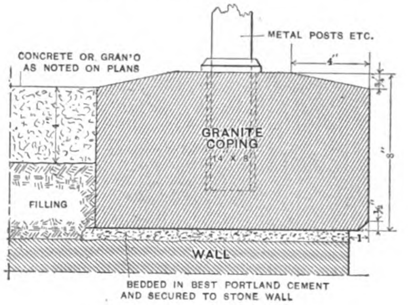
The dining rooms and front chambers are finished with a rich dark green stain, and below the chair rail in the dining rooms the walls are finished with burlap.

The parlors are finished in enamel, while the finish of the rest of the house is natural. The kitchens, pantries, private and rear halls are wainscoted 3 ft. 6 in. high and have an 8-in. beveled base. The stairs are wainscoted 4 ft. high. All floor beams are figured for a load slightly in excess of 70 lb. to the square foot. The architect favors the use of solid work as much as possible on the outside of the house with heavy moldings. Galvanized iron ventilators are placed in front and rear cornice to ventilate the ceiling space over the third story. The second-story belt course under the clapboards is lined with Ruberoid paper about 3-16 in. thick and made thoroughly water tight. No counterflashing was put in over any of the window caps, piazza roof or main roof, but tin was soldered to the zinc on the main roof, turned up 5 in. on the piazza roof and the zinc on the window caps was turned up 4 in. under the clapboards. The gutter on the front piazza is lined with 16-oz. copper instead of tin, as indicated on the detail. All ice chest spaces have a removable galvanized iron pan 10 in. in diameter and 2½ in. deep, a pipe from these draining into a sink in the cellar. All stair rails on inside stairs are set extra high. All angles have a steel corner bead, barrel bins have barrel swings, while the hardware, paper and gas fixtures are of extra design and workmanship.



Foundation.

Section through A B of the Foundation.



Section through Street Wall.

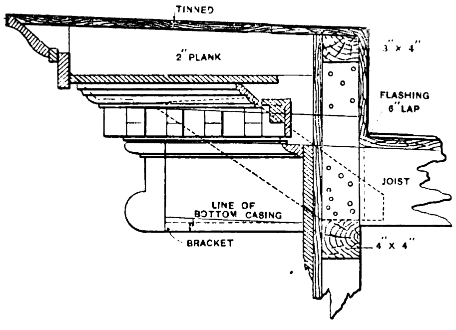
First Floor.

Second Floor.

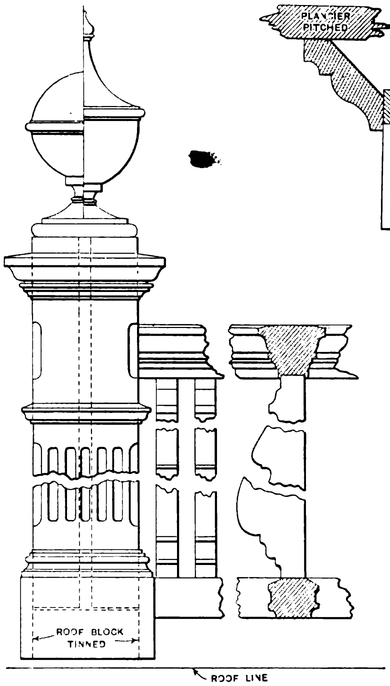
Third Floor.

A Three-Family Apartment or "Flat" House.—Floor Plans.—Scale, 1-16 In. to the Foot.

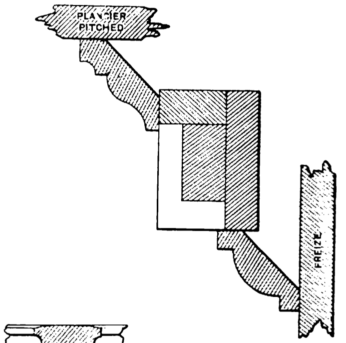
In the pantries are two soapstone wash trays, each



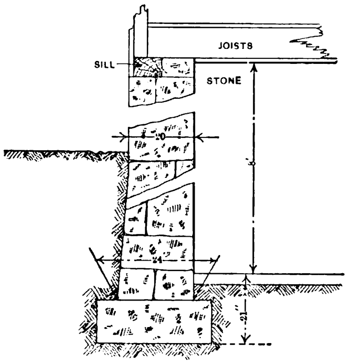
Main Cornice.—Scale, ¾ In. to the Foot.



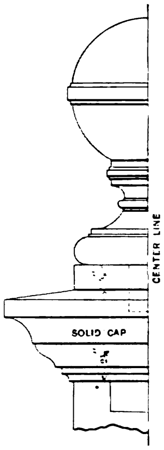
Details of Balcony Over Front Porch.—Scale, 1 In. to the Foot.



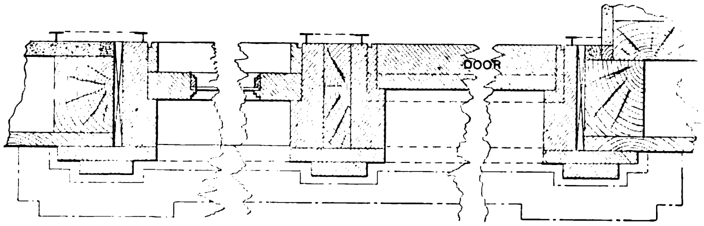
Section of Bed Molding and Dentil Course of Piazza Cornice.—Scale, 3 In to the Foot.



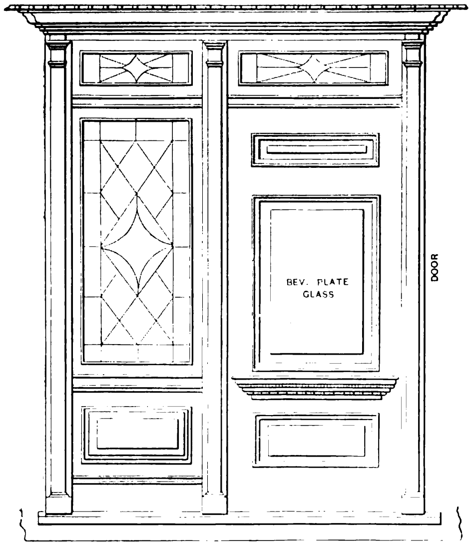
Section through Foundation Wall.—Scale, ¼ In. to the Foot.



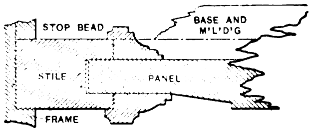
Half Elevation of Cap for Angle Posts.—Scale, 3 In. to the Foot.



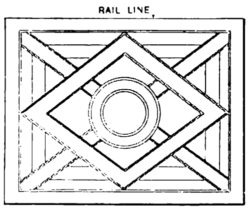
Horizontal Section through Front Door and Frame.—Scale, 1½ In. to the Foot.



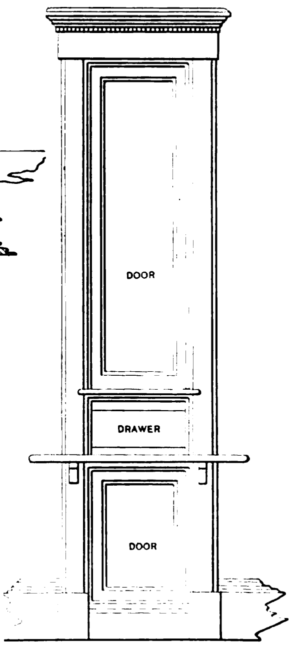
Elevation of Front Door.—Scale, ⅜ In. to the Foot.



Section of Door Panel.—Scale, 3 In. to the Foot.



Balcony Grille.—Scale, 1 In. to the Foot.

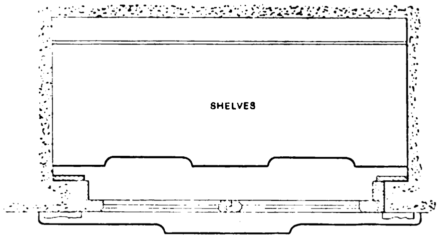


Elevation of Medicine Closet.—Scale, ½ In. to the Foot.

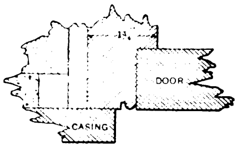
Miscellaneous Constructive Details of a Three-Family Apartment or "Flat" House.

24 x 24 in., and a sink 36 x 24 in. with hot and cold water connections. Each bathroom is provided with a marbleized oval bowl, 14 x 17 in.; a cast iron porcelain enameled roll rim bathtub 5½ ft. long, and combination hopped water closet with copper lined oak tank, all exposed pipes and fixtures being nickel plated. The plumbing is of the open type and the traps are below the floor. Each kitchen is provided with a 30 gal. copper boiler and in the cellar is a cast iron sink 15 x 18 x 6 in.

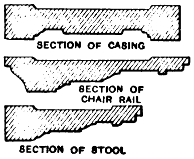
The house is piped for gas and wired for electric bells, front and back door openers, &c. The heating is by hot water and all pipes and fittings above the cellar are gilded.



Plan of China Closet.—Scale, ½ In. to the Foot.

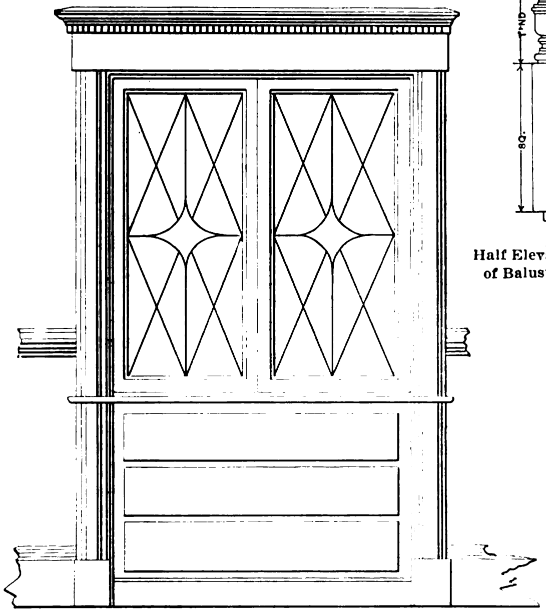


Partial Horizontal Section of Door Frame of China Closet.

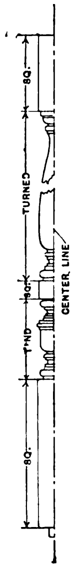


Details of Trim.

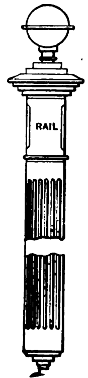
Scale, 3 In. to the Foot.



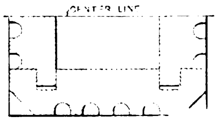
Elevation of China Closet.



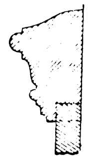
Half Elevation of Baluster.



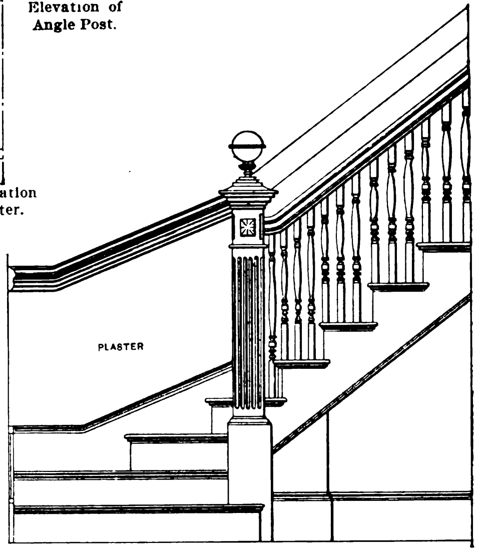
Elevation of Angle Post.



Section of Angle Posts.—Scale, 4 In. to the Foot.



Half Section of Stair Rail.



Partial Elevation of Main Stairs.—Scale, ⅜ In. to the Foot.

Miscellaneous Constructive Details of a Three-Family Apartment or "Flat" House.

In addition to the granolithic walk at the side and rear of the house the entire front to the street wall is granolithic to prevent any water getting in and undermining the construction. There are two 2-in. gas pipe sections in the street wall near the sidewalk line as an outlet for any water which may get in behind this wall. It may be interesting in this connection to state that the composition of the granolithic is as follows: First a layer of cinders 12 in. deep was put in and well tamped and rolled; then on top of that was 3 in. of concrete made in the proportion of one part Portland cement, three parts sand and five parts of clean gravel. The finishing coat is 1 in. thick, composed of one part Portland cement and two parts sand, which was colored and lined in squares. In all cases the pitch is away from the house. The house here illustrated is located on Thornton street, Roxbury, Mass., and was erected for Henry A. Kamp in accordance with plans prepared by George Prescott Connor, architect, 40 Saxton street, Dorchester District, Boston, Mass.

The general contractor for the work was Joseph A. Cruickshank, 1 Carlos street, Dorchester, Mass. The mason contract was executed by John McHugh, 156 Mill street, Dorchester District, Boston, Mass. The plastering was done by J. M. McDonald, 32 Elliott square, Roxbury; the plumbing by A. J. Bosse, 2526 Washington street, Roxbury, and the hot water heating apparatus was installed by Robert H. Lovering, Warren street, Roxbury, Mass. The building was completed early in the summer of 1906 at a cost of $9000.

Modern Workmen's Houses.

A supplementary report on the plan of the Milan municipality to establish a new series of modern homes for workingmen has been received by the State Department from Consul James E. Dunning of Milan, Italy, and from it we quote as follows:

Of two distinct types of houses proposed, the first will be of brick and stone, with four floors, including the ground floor, with specially arranged rooms to secure

light, air and complete sanitary systems. There will be four of these houses, containing a total of 780 rooms, the building cost being $220,000, or about $280 per room. Adding $18,000, the cost of the land, the total cost of each room is about $300. The low cost of Italian labor has an interesting relation, of course, to the expense of carrying out this enterprise as compared with what would be needed in the United States for a similar undertaking. The houses will be of brick and stone, which are cheaper than timber in Italy. Attached to each will be a commodious hall in which will be cared for during the daytime such small children as are not yet in school and whose mothers are employed elsewhere. Particular care will be taken in designing the spaces appropriated for water closets and lavatories.

The second type of house proposed is the first attempt to give to southern Europe the individualized family life of Great Britain and the United States. The plan calls for 64 cottages with a total of 560 rooms and grouped in blocks. Neither the Italian disposition nor the finances of the present undertaking are equal to a consideration of actually separate houses, and I doubt very much that the class for which these accommodations are to be provided are ready for that sort of thing. Attached to each three-room cottage will be a garden space about 20 ft. square, while on the front each will have its separate doorway and entrance. The sum of $190,000 has been appropriated for these cottage tenements, and the total cost per room will be about $380. It is expected that most of the extra cost of this form of construction will be saved in charges for janitor and porter service common to the old type.

For the entire colony a central pavilion containing baths, lavatories, libraries and reading rooms will be established, also public warehouses similar to those now used in the city proper, though built on a considerably improved plan. There is to be a central plant for heating the apartments and for the water used in the washhouses. Men and women will have separate bathhouses, so that these accommodations will be open to both sexes every day in the week. The building cost of this central pavilion is estimated at $30,000, exclusive of land, but including the equipment of machinery and apparatus. This makes the total cost of the Cagnola plan about $450,000. The apartments in the tenement houses will rent for about $18 per room per year and the cottages at $23 per room per year. It is the expectation of the commission that the enterprise will make a net return on the capital invested of 4 per cent. for the tenements and 3.90 per cent. for the cottages.

Production of Cement in the United States.

The rapidly increasing use of cement through the growing popularity of hollow building blocks and concrete for walls, foundations, floors and even roofs of modern structures renders especially interesting the statistics of cement production during the past year. According to the revised and corrected figures of the United States Geological Survey, prepared under the direction of Edwin C. Eckel, the total production of cement for 1905 was 40,102,308 barrels, having a value of practically $36,000,000, as against a total production in 1904 of 31,675,257 barrels, valued at a trifle over $26,000,000. Classifying the production, it is found that 35,246,812 barrels were Portland cement, valued at $33,245,867, and 4,473,049 barrels were natural cement, while 382,447 barrels were what is known as Puzzolan or slag cement.

The present geographical distribution of the Portland cement industry in 1905 indicates 39 plants operating in Pennsylvania, New York and New Jersey (there being none in New England), having an output of 19,589,675 barrels, being a trifle over 55½ per cent. of the total output; 32 plants in Ohio, Indiana, Illinois, Michigan and Missouri, producing 10,723,802 barrels; while in the West, which includes Kansas, Colorado, South Dakota and Utah, 7 plants were operated producing 2,470,349 barrels. On the Pacific Coast are 3 active California plants, producing 1,225,429 barrels, and in the South, which includes Virginia, West Virginia, Georgia, Alabama, Arkansas, Texas and Kentucky, there are 7 plants which turn out 1,237,557 barrels.

Portable Houses for Fire Sufferers.

The Building Committee of the San Francisco Relief Corporation has let contracts for 4000 two-room and three-room portable cottages to be erected in the city's public squares for the purpose of sheltering that portion of the city's population which is still unprovided with homes. One contract calls for 800 two-room cottages, one-half to be delivered and set up within eight weeks from September 1 and the other half within 12 weeks from September 1; another contract calls for 1200 three-room buildings, 400 of which are to be delivered within four weeks from September 1, 400 within eight weeks and 400 within 12 weeks; the third contract calls for 1500 three-room cottages to be delivered within 75 days from September 4, and the final contract calls for 500 two-room cottages to be delivered within 12 weeks from September 4. The two-room cottages are to be 10 x 15 ft. and to cost $100. The three-room cottages are to be 14 x 18 ft. and to cost $135. The action of the relief corporation in ordering these cottages was necessitated by the fact that the former plans did not promise relief to the present situation before the rainy season sets in. The houses are to be permitted to remain on the public squares until August 17, 1907.

Calculating Board Measure Mentally.

The method of calculating board measure used for many years around the sawmill and in making out bills of lumber for buildings and other structures, is described by a writer in *The Tradesman* as follows: First find the amount in 1 lineal foot of the board or stick of lumber by multiplying the width by the thickness, and the product will be in inches. Reduce the product to feet and fractions of a foot, then multiply this product by the length of the stick, and you will have the amount of lumber in the stick. For example: If the stick be 2 x 4 and 14 ft. long, in 1 lineal foot there are 8 in., which is two-thirds of a foot, and in the whole length there are 20-3, which is 6 2-3 ft.; or, if the stick be 4 x 5 ft. long, there are 20 in. in 1 lineal foot, which is 1 2-3 ft., and in the whole length there are 23 1-3 ft., and so on for all sizes and lengths. These fractions may look formidable at first, but with a little practice, first with pencil and paper until the mind becomes trained a little to the method, you will find that you can tell in a minute the amount of lumber in a stick or board of any given dimensions and length, and then it is an easy matter to find out how many pieces of a given size and length it will take to make the number of feet required to fill the bill for that size and length.

The advantage in this method of calculating board measure is that the numbers to be multiplied and divided are kept small enough to be handled mentally; whereas, by the ordinary method, the numbers become so large that the mind cannot handle them without a very great effort, and one is forced to use pencil and paper to obviate the mistakes which are sure to occur.

◆

An interesting feature of the new Maryland Institute Building, at the corner of Mt. Royal avenue and Lauvale street, Baltimore, Md., is the heating and ventilating system which has been installed. The heating system consists of the customary plant for steam, with the addition of heated air. The latter is brought in from the outside, passed over heated coils and after having been purified is distributed through the building. A suction fan is used for drawing the air down a shaft 5½ x 6½ ft. and then through filters for the purpose of purifying it. The fan is 6 ft. in diameter, and the claim is made that it will force not less than 18,000 cu. ft. of air into the building each minute.

KNOTS, HITCHES AND SPLICES FOR THE BUILDING MECHANIC—III.

By Edward H. Crussell.

THE Blackwall hitch, shown in Fig. 34 of the illustrations, is simple and useful. But although simple to make on the end of a rope, it is a little more difficult to form in the middle of one, and is likely to cause some embarrassment to the novice the first time he essays to use it. He will generally try to hang the rope on the front part of the hook, while the whole thing consists in putting the rope around the back of the hook. Form a bight in the rope and hold one side in each hand; pass the bight around the back of the hook and cross the single one on top; fasten the end of the rope to the standing part by means of a bowline knot, or the bowline knot may be tied first and the hitch formed afterwards.

Fig. 36 shows a racking hitch, which is another manner of fastening a rope to a hook. First form two bights in the rope as represented in Fig. 37, twist them over from you two or three times, and put them together on the hook. This is a good way to shorten the end of a sling after it has been looped around its load. This hitch is sometimes called a catspaw, but the real catspaw, though used for the same purpose, is made a little differently. Commence with a marline-spike hitch, as indicated in Fig. 38, holding the bights B and C one in each hand, turn them over from you two or three times

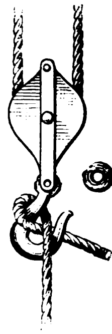


Fig. 34.

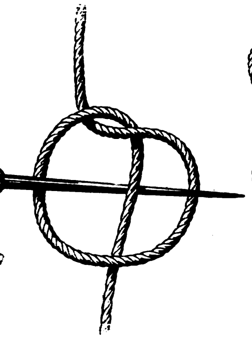


Fig. 35.

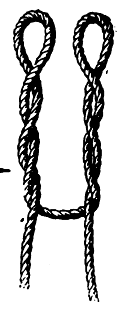


Fig. 36.

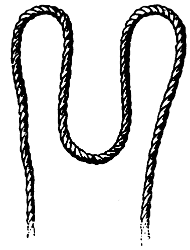


Fig. 37.

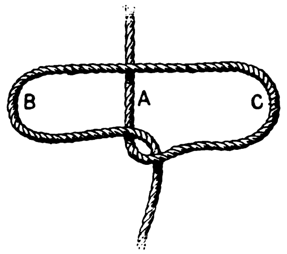


Fig. 38.


Fig. 39.

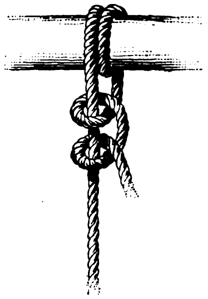


Fig. 40.

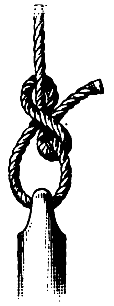


Fig. 41

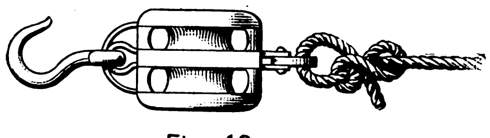


Fig. 42.

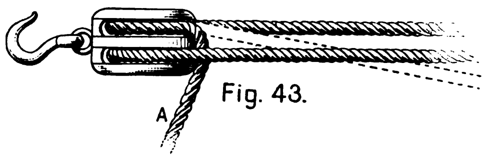


Fig. 43.

Fig. 34.—The Blackwall Hitch.
Fig. 35.—The Marlinspike Hitch.
Fig. 36.—A Racking Hitch.
Fig. 37.—Manner of Forming Bights to Make a Racking Hitch.
Fig. 38.—Manner of Forming a Catspaw and "Manharness."
Fig. 39.—The Fisherman's Bend.
Fig. 40.—Fastening a Rope by the Round Turn and Two Half Hitches.
Fig. 41.—The Sailor's Knot.
Fig. 42.—Another Sailor's Knot.
Fig. 43.—Method of Snubbing the Fall of a Tackle in Its Own Block.

Knots, Hitches and Splices for the Building Mechanic.—III.

hands, taking care to have the main or pulling part of the rope on top. This hitch is very useful in house moving, mainly for the purpose of extending the reach of a tackle by means of a large single rope, so as to enable us to put the crab (or other source of power) as far as possible from the building to avoid making too many moves. Attach one end of the large rope to the building and the other end to the largest block of the tackle, by means of the Blackwall hitch. Every time you get "block and block" overhaul the tackle and attach again. It takes two men to do it properly, one to hold up the block and the other to make the hitch. There is no danger of this fastening slipping unless the rope is too small to fill the hook, in which case it is better to use a clove hitch, or a catspaw, on the front of the hook.

The marline-spike hitch, represented in Fig. 35, is used for a number of purposes, but its chief use for us is as a means of fastening a rope to a plank that is to be used as a swing staging. Put the plank through in place of the marline-spike, shown in the illustration, with the two strands of the hitch at the bottom of the plank and the and put them together on the hook. This is a very safe hitch.

A knot called "Manharness" is also commenced with a marline-spike hitch. It is used to form a number of loops along the length of a rope, where it is necessary to drag timbers or other heavy weights along the ground by means of man power. Referring to Fig. 38, pass the hand under the center strand A and take hold of B, draw B through the bight C and the knot is formed. A little care must be used to get the knot to jam properly or a slip knot will be formed.

The Fisherman's bend shown in Fig. 39 is a capital way of fastening a rope to a ring. Another good fastening is the round turn and two half hitches, shown in Fig. 40. We can use the Fisherman's bend to attach one end of the guy line of a derrick to the ring at the top of the mast, and the fastening shown in Fig. 40 to secure the other end of the guy line to the "dead man" or whatever is being used for an anchor.

The sailor's knot illustrated in Fig. 41 is another good fastening that may be used for a variety of pur-

poses. Sailor's knot is rather an indefinite term, as nearly all knots are sailor's knots (most people call the reef knot a sailor's knot), but if the short end of Fig. 41 is pulled down alongside the standing part until the knot runs across instead of lengthwise, Fig. 41 will then prove to be the knot with which the sailor ties his neckerchief, and it is from this that it takes its name.

Fig. 42 is also called a sailor's knot and is perhaps as good as the other and a little easier to tie. Either of these knots may be used for the purpose shown in Fig. 42, which is better than splicing the rope to the block, unless the tackle is only to be used for some special purpose. Perhaps here would be a good place to set down a few hints regarding the use of ropes and tackle that the writer has found to be of practical utility.

It is a mistake to splice the rope to the blocks, because, in the first place, they can be more easily stored away or carried from place to place when they are separate, and again fastening the rope permanently to the blocks limits the use of both rope and blocks. With the blocks separate from the rope we are enabled to use different lengths of rope in them, and so perhaps some day will be able to avoid dragging two or three hundred feet of rope through the mud—and one day in the mud will do more harm to a rope than a month of fair usage. We can also, if necessary, use the rope for guy lines, or other purposes, without the bother of dragging the blocks around with it.

On some classes of work we can save time if instead of pulling the tackle up block and block, and then coiling up the rope, we coil it up just as it is, first taking a half hitch around the nearest block with the pulling end of the rope to prevent it getting entangled. There are a number of "sure grip" blocks on the market and very handy they are for certain classes of work. But none of them that I have seen will work when the block is in a horizontal position, and again, when you have not these blocks you must get along without them.

Fig. 43 shows a very handy method of snubbing the fall of a tackle in its own block. All that is necessary to do being to pass the fall of the tackle between the other ropes before starting to haul on it (the dotted lines in Fig. 43 show this) and then as soon as you are far enough pull the end around as shown at A, jamming it between the sheave and the rope that lies next to it. A neat way of snubbing the fall of a tackle used in raising or lowering a swing staging is to bring the fall through the iron or rope hanger of the staging and then take it up and make it fast to the hook of the block by means of a half hitch, as indicated in Fig. 44. The half hitch is quite secure, but if there is room on the hook for it, it will be better to use two half hitches, or a clove hitch.

Sometimes when rolling logs or timbers up onto an elevation, such, for example, as a railroad car, a rope is first fastened to the car, brought down and around the timber, taken back to the car, and with one or two men pulling on this end material assistance is given to those who are rolling.

A much better way but one not so often used is to fasten the rope to both car and timber, and as the timber goes up let the rope wind around it. In this manner the timber holds itself on the skidway, all that is necessary to do being to cant it over; with square timbers two ropes can be used, one at each end, but in the case of round logs or tapering timbers, only one can be used, and that in the center. This rig is especially useful in the winter time when the timber is covered with ice, or when the crew is too small to properly handle the timber; it would only be wasting time to use it where there was help enough to do without it.

The pins that hold the sheaves in the larger blocks are generally arranged so that they may be easily taken out, and in the case of a stiff or tight fitting rope it is sometimes easier to take out the sheaves and reeve the block in this manner, rather than trying to thread the rope through with the sheaves in the block.

A barrel that has both heads in may be slung and hoisted quite handily, either with a sling, as shown in Fig. 45, or by tying a large loop in a rope with a bowline knot and using it in the same manner as the sling. If the barrel has only one head in it must then be slung upright, and Fig. 46 shows how a sling may be used for this purpose. But the best method of all is shown in Figs. 47 and 48. Tie first an overhand knot at a sufficient distance from the end of the rope, open this knot out, as shown by Fig. 47, and place the barrel in it in the same position as the pencil is there shown, finish the knot by fastening the free end to the standing part

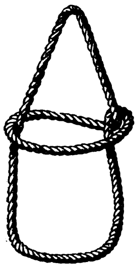


Fig. 46.

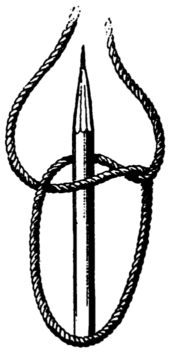


Fig. 47.

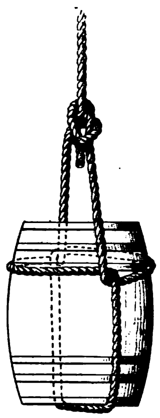


Fig. 48.

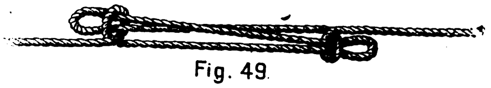


Fig. 49.

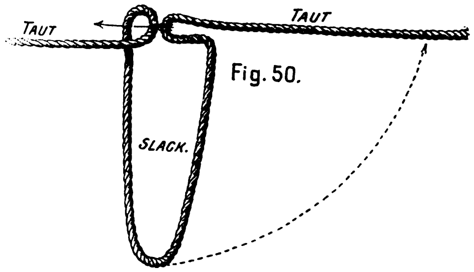


Fig. 50.

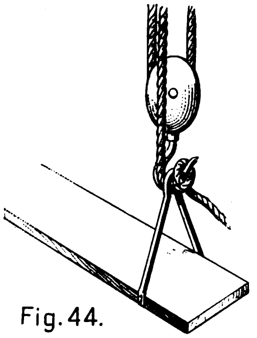


Fig. 44.

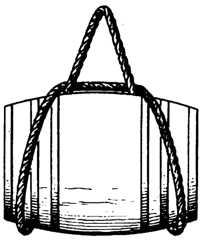


Fig. 45.

Fig. 44.—Method of Snubbing the Fall of a Staging Tackle.
Fig. 45.—Slinging a Barrel with Both Heads In.
Fig. 46.—Upright Sling for a Barrel Having Only One Head In.
Fig. 47.—Best Manner of Forming Sling.
Fig. 48.—The Sling Shown in Fig. 47 Completed.
Fig. 49.—A Sheepshank.
Fig. 50.—Manner of Tying a Sheepshank.

Knots, Hitches and Splices for the Building Mechanic.—III.

by means of a bowline knot. The entire arrangement is shown in Fig. 48. The barrel may be stood on the rope and the knot formed over the top of it.

Whenever it is necessary to cut rope it is a good idea to cut it odd lengths if possible. For instance, supposing you have a 500 ft. coil of rope which is longer than you will need for any purpose; do not cut it into equal ropes of 250 ft. each, make one 300 and the other 200. Again, do not cut up your new rope for tag lines or hand lines, if it can be avoided; use up your old rope for this purpose.

It will perhaps be thought that this last paragraph is not necessary, "Anybody ought to know enough for that." I have had it impressed upon my mind that there are lots of people who, even if they know enough, do not follow this rule.

Speaking of cutting ropes, let's go back to the first subject and take a look at the sheepshank, shown in Fig. 49, which is a neat method of shortening a rope without cutting it. Fig. 50 shows how it is tied. Pull up the rope till it is taut, or until it is the proper length, letting the slack drop between the hands; make a half hitch with the rope in one hand and slip it over the doubled end of the rope that is in the other; take the slack back along the standing part and make the other half hitch. A marline-spike hitch may be used in place of the half hitch and makes a little better job. Either way is quite secure.

Convention of Concrete Block Machine Manufacturers' Association.

ACCORDING to programme the members of the Concrete Block Machine Manufacturers' Association of the United States held their second annual convention at the Wayne Hotel, Detroit, Mich., on Wednesday and Thursday, August 8 and 9. Much interest was manifested in the proceedings, and the reading of the papers which were presented was followed with the closest attention. The first session was called to order by President J. F. Angell, who delivered his annual address, reviewing the work of the year and showing that the organization had been active in advancing the interests of the industry. He referred to the single resignation which had occurred during the year, and to the death of J. W. Shone, Rochester, N. Y. He urged upon the members the necessity of doing everything possible for the good of the cause, and as the manufacture of cement block machinery is growing every day, with new features constantly developing, "it should be the duty of every manufacturer to do all he can to perfect the methods and further the interests of all concerned."

Owing to the resignation of C. C. Huston in February last Mr. Angell has acted in the double capacity of president and treasurer since that time.

The remainder of the morning session was devoted to routine business and after lunch the formal reading of papers was resumed. The first was that of R. L. Humphrey on "The Concrete Block; Its Possibilities and What the Government is Doing in the Investigation of Its Qualities." The author told of the tests which are being made at the Cement Pavilion on the old Exposition grounds at St. Louis under Government supervision, and pointed out how manufacturers of machines could correct some of the abuses at present existing by teaching those to whom the machines were sold just how to proceed in order to turn out the best blocks. He called the attention of manufacturers to the fact that it devolved upon them to make a block that would meet the demands of the modern architect. He pointed out that the behavior of blocks in the recent San Francisco calamity was due in large measure to faulty construction and not to the blocks themselves. He outlined the tests of the Government on blocks, saying that inquiry would be made as to the strength, porosity, permeability, &c. The fire test will be carried out under a temperature of 1500 degrees, and blocks will be subjected to trial that will be much more severe than any that can arise in actual use. Some of these tests will be made at the laboratory of the Underwriters in Chicago, and Mr. Humphrey expressed the belief that the members of the insurance associations would be perfectly willing to grant a reasonable rate when they were satisfied of the good qualities of the blocks.

What Mr. Humphrey had to say was followed with the closest attention, and when he had concluded a committee was appointed to draw up specifications for tests that should result in absolutely fair treatment for everybody.

The next paper on the programme was one by Secretary S. L. Wiltse on "Concrete Block Insurance," in which he pointed out that the situation was about the same as a year ago, and then referred to correspondence which had passed between him and the insurance people relative to tests of blocks. The insurance people appeared to be waiting for some proof, either one way or the other, as to the fire resistance of the concrete blocks, as the few real tests to which they have been submitted have not been altogether encouraging, nor have they justified any sweeping condemnation of the material. What was urged in the matter was the necessity of intelligent, honest workmanship in the production of blocks. An animated discussion followed the reading of the paper, and the general feeling appeared to be that the insurance companies were disposed to be fair and that a rate satisfactory to all parties would be obtained as soon as the insurance authorities could be satisfied as to the quality of the blocks.

Frank L. Dykema, Grand Rapids, presented a most interesting paper on "Specifications for Concrete Blocks and Brick," in which he emphasized the necessity for standardization and laying down practical rules and regulations which had been adopted by the committee of which he is a member. We present in another part of this issue some extracts from the paper in question.

Another paper, prepared by R. R. Fish, related to a special demonstration of "Medusa" waterproof compound, the author showing its behavior under different conditions, following which was an interesting presentation of "Freight Classifications for Concrete Machinery," by President Angell. He offered numerous suggestions relative to phases of the subject of general interest to the members, and as a result of the active discussion which followed a committee, consisting of the author of the paper, together with O. U. Miracle, M. Wetzstein and A. T. Bradley, was appointed to confer with the proper authorities regarding freight classifications.

Thursday's Sessions.

At the morning session on Thursday the reading of papers was continued, attention being first given to one by M. Wetzstein on "Foreign Trade." The substance of the author's remarks consisted in a consideration of the posibilities of pushing American building block machines in the foreign market. In his paper on "Concrete Block Architecture" A. T. Bradley presented some interesting thoughts, which considered the rapidly growing use of concrete blocks as a building material, and emphasized the fact that the architect must be regarded as an important factor in the matter. The author pointed out the necessity of block makers giving more attention to the quality of the sand employed and to the fact that very fine, attractively designed buildings are spoiled by the use of inferior sand.

E. G. Harter of Detroit made some valuable comparisons in prices in his paper on "Ornamental Products." He stated that with labor at $2 a day, cement at $2 a barrel and sand at $2 a yard he could make a Renaissance balustrade post for 10 cents, which cut in stone would cost about $10. He urged greater care in the manufacture of "forms" used in ornamental work and offered hints on successful methods. Other papers at the morning session included those by S. J. Young on "Advertising," by C. W. Stevens on "Cast Stone," by J. P. Sherer on "Coloring of Concrete Productions." There was an informal talk on "White Cement" by M. M.

Smith, and what he had to say was followed with close attention on the part of those present. The statement was made that this cement had been made for something like six years, but only recently had been put on a commercial basis.

At the afternoon session W. G. Sanderson, inspector and member of the Committee on Cement for Building Construction of the National Fire Protection Association, presented some interesting comments on concrete blocks and brick, assuring the members that the association he represented was perfectly willing to afford fair treatment to concrete blocks as building material just as soon as the manufacturers could standardize their product so that every block would withstand the tests to which they are subjected in the underwriters' Chicago laboratory. He intimated that while in his opinion hollow blocks are the coming building material, there are at present too many small makers who are careless or indifferent as to the quality of the blocks which they turn out. He stated that the association expected to accumulate about 4000 blocks in Chicago within a period of three months, but in order to be acceptable he said it would be necessary for them to be of a better quality than some that had been received, as many of them disintegrated while they were waiting to be tested and others were received in a crumbling mass, broken in transit. Mr. Sanderson quoted figures showing that while the fire loss in Germany is 41 cents per capita and in Austria 21 cents, it was $2.59 in the United States.

It was suggested by S. L. Wiltse that the name of the organization be changed to the National Concrete Machinery Manufacturers' Association, so as to enable the mixer and brick machine people to become members. Later in executive session the name was changed as suggested, and officers for the ensuing year were elected as follows:

President, J. F. Angell, Columbus, Ohio.
Vice-president, O. U. Miracle, Minneapolis, Minn.
Secretary, Sid. L. Wiltse, Jackson, Mich.
Treasurer, Mentor Wetzstein, South Bend, Ind.

It was decided to join the National Fire Preventative Association for the purpose of pushing the insurance question, and a fire insurance committee was appointed to co-operate with that organization. The committee is made up of S. L. Wiltse, J. F. Angell, A. T. Bradley, F. L. Dykema and R. Pulfer. Two members of this committee will represent the association at the meeting of the Fire Preventative Association in New York in May next.

A committee was also appointed consisting of Mr. Dykema and Mr. Miracle to revise the concrete block machine manufacturers' specifications for concrete blocks so as to include brick and to make it a point to send the specifications to all important cities and towns of the United States with a view to suggesting their adoption for the manufacture of bricks, blocks, and concrete products, as by adopting such specifications a manufacturer of this material could not fail to make good concrete blocks. It was the decision of the members present to put forth every effort to inform their customers of the necessity of taking particular pains with their product and make nothing but the best so as to insure favorable consideration on the part of the insurance interests. It was also decided that the members of the association no longer send out their concrete machinery on trial, but that in every instance partial payment accompany the order.

Members Present.

Among those present at the convention may be mentioned the following:

R. R. Fish, Sandusky Portland Cement Company, Sandusky, Ohio.
C. D. Frederick, Columbus, Ohio.
E. T. Rose, Columbus, Ohio.
J. F. Angell, Winget Concrete Machine Company, Columbus, Ohio.
John Monoghan, Alpina Portland Cement Company, Alpina, Mich.
Samuel J. Vail, Samuel J. Vail & Co., builders' supplies, Detroit, Mich.
M. Wetstein, Ideal Concrete Machinery Company, South Bend, Ind.
Charles W. Stevens, Harvey, Ill.
Robert Seiderg, Century Cement Machinery Company, Rochester, N. Y.
Melville M. Smith, Art Portland Cement Company, Syracuse, Ind.
G. B. Pulfer, Ideal Cement Machinery Company, South Bend, Ind.
E. T. Bradford, Chicago, Ill.
A. T. Bradley, Rochester, N. Y.
J. Augustine Smith, Detroit, Mich.
C. O. White, Jackson, Mich.
F. I. Dykema, Dykema & Son, Grand Rapids, Mich.
E. C. Harter, Cement Working Machine Company, Detroit, Mich.
C. U. Miracle, Miracle Pressed Stone Company, Minneapolis, Minn.
Richard L. Humphrey, St Louis, Mo.
H. S. Palmer, Palmer Mfg. Company, Washington, D. C.
Kirk H. Brown, Detroit, Mich.
G. B. Miles, P. B. Miles Company, Jackson, Mich.
W. P. Butler, Minneapolis, Minn.
C. L. Stillman, Detroit Concrete Stone Company, Detroit, Mich.
Edgar H. Defenbaugh, "The Barrel and Box" rock products, Louisville, Ky.
W. P. Cosgrove, Municipal Engineering Company, Indianapolis, Ind.
H. C. Green, Columbus, Ohio.
B. H. Rader, Illinois Steel Company, Chicago, Ill.
Sid L. Wiltse, Cement Machinery Company, Jackson, Mich.

◆◆◆

Quality of Cement Blocks in Collapsed Building.

Architects and builders the country over will be interested in the Government's report on the quality of the cement blocks used in the recently collapsed concrete building at South Framingham, Mass. Tests made from a large number of blocks taken at random from the ruins showed they had a crushing strength of from 63,000 to 130,000 lb. each, according to the size of the block. As further investigation progresses the idea that the cement blocks in themselves were at fault is generally being abandoned, and two probable causes are now assigned, although the official investigation is not at this writing completed. One possible cause is that there was an underlying strata of quicksand beneath the foundations which gave way from the weight of the concrete floors and roof. Another reason assigned is that the steel skeleton frame, which bore a large part of the load, was figured too light, and with the weight of the concrete roof, much too heavy it is intimated, buckled, tearing down the walls in its fall. Perhaps the full official investigation may disclose other reasons for the collapse, but in the opinions of those qualified to judge it will be found that concrete construction, as such, was in no wise responsible for the wreck which caused the loss of life.

◆◆◆

House Interior Arranged Like a Ship.

What might be termed something of a freak in house construction has recently been erected by a sea captain in New Orleans, La. The owner, it appears, likes to feel that he is aboard a vessel even when he is at home, and the interior of the house is so constructed as to suggest this at all times. The house overlooks the river, and the captain's vessels land directly in front when they are in port. The house is 54 ft. square, surrounded by an iron fence with cement pavements. The rooms resemble the interior of a ship, as there are port holes, companionways for stairs, while the lower floor, on which is located the storeroom, bears a striking resemblance to the hull of an ocean-going vessel.

The lower story is of brick, the upper of frame, while the roof of slate is modeled after the Japanese style. The eaves and cornice were built directly from Japanese patterns. The house is ceiled with pressed steel, and finished as elaborately as the saloon of a ship. The cupola is constructed like a pilot house and has windows all around. The gallery is continuous, and at any time the owner can swing his hammock so as to be in the shade. Electric lights are used for illuminating, and everything is so situated that it is unnecessary to leave the house for anything, even the cistern being located on the gallery. The house was built by the captain and his crew of boat builders at a cost of about $8,000, and one year was occupied in the work. The owner is satisfied that he has a house the like of which cannot be found anywhere in the State, and he takes great pride in showing his friends over it.

ANOTHER PROBLEM IN GEOMETRICAL HANDRAILING.

BY MORRIS WILLIAMS.

THE plan of a stairway having a cylinder containing four risers at the junction of a flight with a landing is shown in Fig. 1 of the engravings. A platform and two straight steps take the place of winders around the cylinder. The two first risers in the cylinder are shown slightly curved, and the first one outside the cylinder is placed about two inches from the springing. This arrangement of the risers in and adjoining the cylinder will greatly facilitate manipulation of the wreaths.

The elevation of the steps where the pitch over the three lower tangents forms an inclined straight line, the inclination being slightly in excess of the pitch over the flight, is presented in Fig. 2, the upper tangent as shown at 1 2 to be a level tangent aligning with the central line of the landing rail. To draw this figure unfold the side plan tangents *a b* and *c d;* and on the points *h, b, n, d* and *g* on the line X Y, erect perpendicular lines, as *h l, b* 2, *n* 3, &c. From *h* on X Y, to *w* on *h l*, measure the hight of four risers, and from *w* to 1 measure the hight of one-half a riser. Through *w* draw a line to represent the landing floor and through 1 a line to represent the center line of the landing rail. Continue the center line of the rail through 1 to 2; and from 2 draw the pitch line of tangents 2, 3, 4, 6, 7 to intersect the center line of the flight at 8. Upon *g* erect *g* 6 and draw the ground line 6 Z; which, as here shown is raised the hight *g* 6 to meet the necessity (arising out of the difference in pitch between the pitch line of tangents and the pitch line of the flight rail) of ramping the upper part of the flight rail to align with the pitch of the tangents.

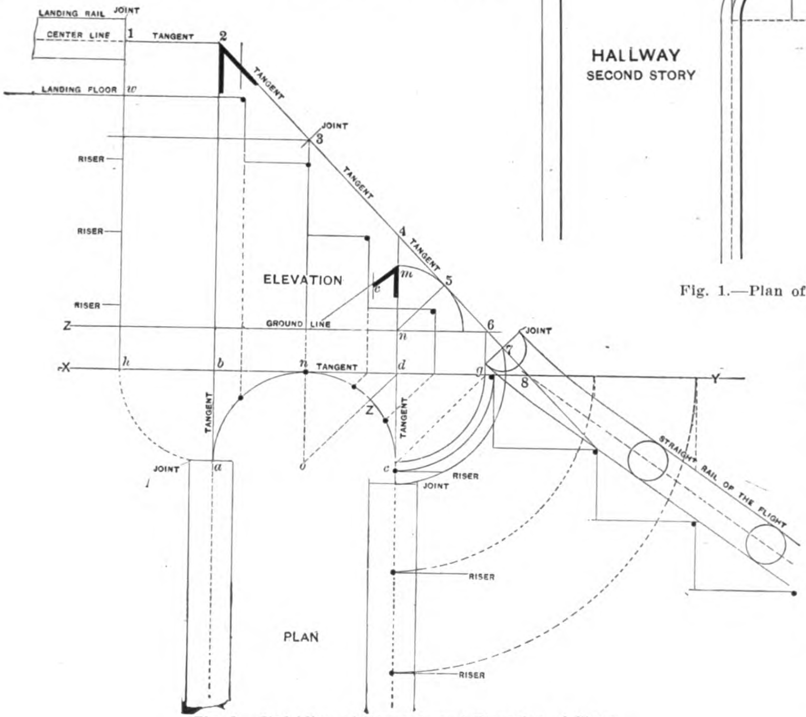


Fig. 2.—Unfolding of Tangents and Elevation of Steps.

Another Problem in Geometrical Handrailing.

The two wreaths are shown in this figure to be composed of three equally inclined and one level tangent. The conditions of the upper wreath, which extends from 1 to 3, call for the tangent 1 2 to be level so as to align with the level landing rail, and the tangents 2 3 to be inclined to align with the inclination of the tangents 3 4 and 4 6 of the lower wreath.

The level tangent 1 2 will stand over and above the plan tangent *a b*, and the tangent 2 3 over and above the tangent *b n*.

These tangents are presented in perspective in Fig. 3. the level tangent 1 2 is shown over and above *a b*, 2 3 over and above *b n;* and the center line of the wreath is also shown to be over and above the plan center of the rail. It will be observed that the geometrical problem encountered in the construction of the face mold in this case is merely the one to find the form of a section, cut oblique to one side of a square prism, and the solution consists in forming a parallelogram having two sides equal the tangent 1 2 and the opposite two sides equal the tangent 2 3. The outlines of the parallelogram are shown in Fig. 3 at 1 2 3 0, where 1 2 is shown to be the upper tangent to connect with the landing rail and 2 3 to be the lower tangent to connect as shown at 3 in Fig. 5 with the bottom wreath.

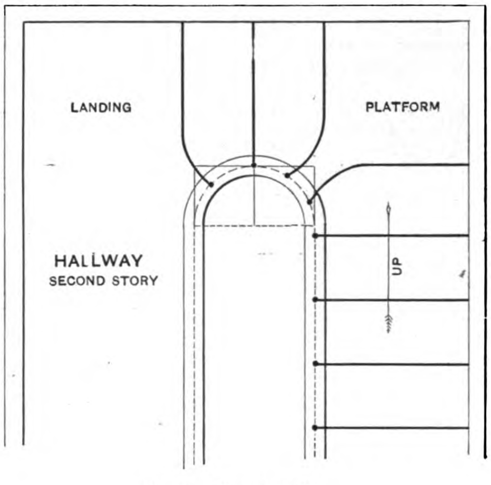


Fig. 1.—Plan of Stairs.

The true shape of the parallelogram that constitutes the form of the section is shown in Fig. 4 at 1 2 3 0, 1 2 being equal to 1 2 in Fig. 2 and 2 3 to 2 3 in the same figure, while 3 0 and 0 1 are the springing lines. The width of the mold at 3 will be the same as that of the straight rail, owing to it being on the minor axis, and the width at the end 1 is taken from the bevel shown in Fig. 2 at 2. The outside and inside curves are described by means of the method known as the "pin and string method." The bevel to square the wreath, as already stated, is shown at 2 in Fig. 2, and is shown applied in Fig. 4, where the thickness of the plank required is also shown at *a b*. The same level is shown applied in Fig. 3 to one end of the wreath, where the other end also is shown to be square without a bevel, owing to the section in the direction of the line 3 0 being level.

We will now proceed to draw the face mold for the bottom wreath, the tangents of which are shown from 3 to 6 in Fig. 2 to be equally inclined, and therefore, the

problem will be to develop a section, cut through a square prism when cut oblique to two of its sides. Such a prism is shown in Fig. 5. Its base *o n d c* is equal to *o n d c* shown in plan Fig. 1, and its sides 3 4 and 4 6 represent the tangents, while the lines marked 0 3, 3 4, 4 6 and 6 0 indicate the outlines of the form of the section, where the bevels are also shown to indicate the inclination of the plane to both sides of the section. The ramp in the rail of the flight to align with the inclination of the tangent 4 6 is also shown in Fig. 5. In this connection it will be observed that the distance shown from *g* to *d* which corresponds with *g* 6 in Fig. 1 and indicates the hight of the ground line, is raised to meet the necessity of ramping the rail.

The method of drawing the face mold is shown in Fig. 6. Draw the line *a b*, and to it transfer the points 3, 4, 5, 6, 7 from the pitch line of tangents in Fig. 1. From 5 drop the perpendicular line 5 6"; place one leg of the compasses on 4; extend the other to 6, and turn over as shown to intersect the line previously drawn from 5 in 6"; connect 6" with 4, which last line will be the lower tangent as required in the face mold, the other tangent being the line 3 4.

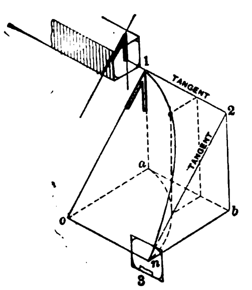


Fig. 3.—Square Prism Cut Oblique to One Side, Showing the Section Whereon the Upper Wreath Is Assumed to Rest.

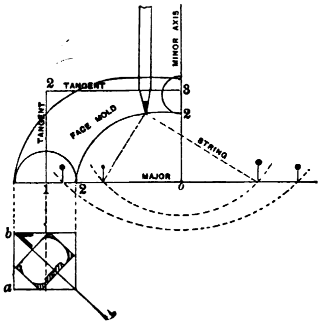


Fig. 4.—Face Mold for Top Wreath.

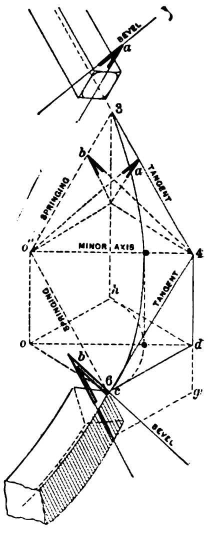


Fig. 5.—Square Prism Cut Oblique to Two of Its Sides, and Showing Ramp in Rail.

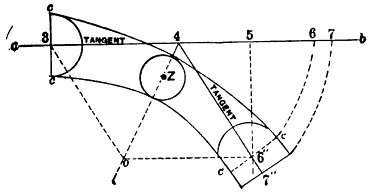


Fig. 6.—Face Mold for Bottom Wreath.

Another Problem in Geometrical Handrailing.

Now draw 3 *o* parallel to 4 6" and 6" *o* parallel to 3 4; connect 4 *o*; make 4 *z* equal *d z* in the plan shown in Fig. 1 and draw the circle, as shown, with a radius equal t othe plan width of the rail. The circumference of this circle will determine the width of the mold at this point, owing to the line 4 *o* being the minor axis of the ellipses which constitute the curves.

To find the width of the mold at each end we will need to find the bevel. Referring to Fig. 2 the bevel is shown to be the upper angle of a triangle, its base being equal to the radius of the center of the plan rail and its altitude equal to the line *n* 5, which in Fig. 2 is shown revolved from 5 to *m*. The distance from *m* to *c* on this bevel placed on each side of 3 and 6" in Fig. 6, as shown at 3 *c*, 3 *c* and 6" *c*, 6" *c*, respectively, will determine the width at each end.

Now the outside and inside curves of the mold may be described by bending a flexible lath to touch *c c* and the circumference of the circle as shown for both inside and outside of the mold. The distance from 6 to 7 on the mold is taken from Fig. 2, and because it is below the ground line, as there shown, it is outside the cylinder, and therefore does not belong to the wreath proper, but rather an auxiliary addition of a straight piece to extend the joint of the wreath beyond the springing of the cylinder, so as to secure a more graceful ramp at the junction of the wreath with the bottom straight rail.

The bevel for this wreath is to be applied to both ends (reversely) as shown in Fig. 5. It will be observed that one bevel will do for both ends; in that the plane of the section has the same inclination in both directions to the sides of the prism.

In Fig. 7 is presented a combination of the two prisms to illustrate more graphically the utility of unfolding sections of prisms in geometrical handrailing. In this figure is also shown the development of the center line of the wreath, reaching from 6 to 3 along the plane of the section cut through one prism; and from 3 to 1 along the plane of the section cut through the other prism. The level tangent is shown to align with the level rail of the landing and the bottom tangent to align with the ramp in the rail of the flight adjoining.

◆

London's New Steel Frame Hotel.

Among the recent additions to the hotel accommodations in the city of London is a six-story skeleton frame building, which was put up by a firm closely allied to a leading American contracting concern. It covers an area about 80 x 150 ft., which was previously occupied by two seven-story brick hotels, with cast iron columns which supported the upper walls and the steel beam and concrete floors. In connection with the work of tearing down the old buildings it was necessary to remove the 3-ft. layer of cellar floor concrete, and in doing this work 2½-in. holes 22 in. deep and 18 in. apart were drilled and the concrete blasted out and carted away. Below the concrete the general excavation was continued about 4 ft., bringing it to a depth of 22 ft. below the curb.

The party wall of the adjacent building was about 40 ft. high and was so thick and strong that it was underpinned without the use of needle beams. Pits about 6 ft. deep, 6 ft. long and 6 ft. apart in the clear were excavated under the old footing without destroying the stability of the unsupported wall above them or causing any injury to the masonry. In them new footings were built at the level of the footings for the new building, and on them brick piers were erected to engage the old wall. When they were well set the weight of the old wall was transferred to them, the spaces between the first set of pits were excavated, and the footings and brick underpinning made continuous between the underpinning piers, thus extending the old wall down to the required depth. During these operations no bracing was used except inclined shores.

Before removing the old walls below the first floor

a trench, sheeted and braced in the usual way, was excavated all around the sides of the building, and in it was built a brick retaining wall 5½ ft. thick at the base and 2 ft. thick at the top, heavy enough to resist the outside pressure without bracing. This wall was waterproofed by a damp course ¾-in. thick of asphalt applied in two layers on the inner surface of a 4-in. brick outside wall built up in 18-in. courses in advance of the main wall.

The new walls have offset brick foundations and concrete footings. The column foundations are two tiers of I-beam grillages on a concrete footing 18 in. thick, carried down to a level 5½ ft. below the basement floor.

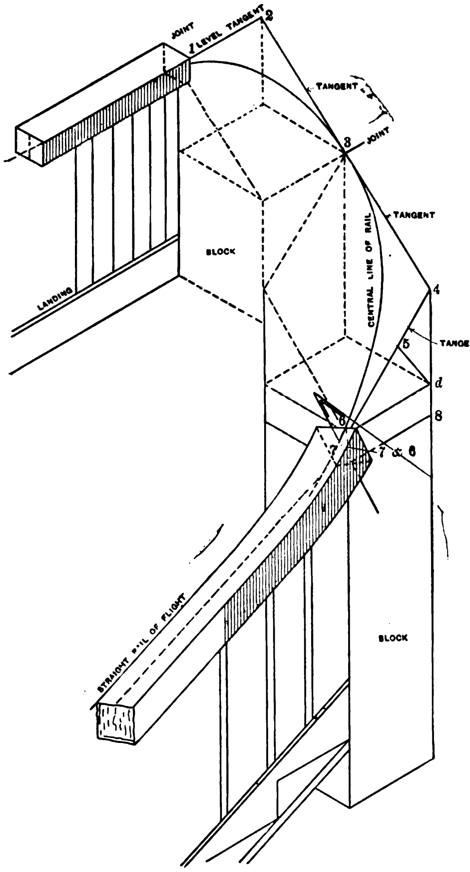


Fig. 7.—Combination of the Two Prisms in Figs. 3 and 5.

Another Problem in Geometrical Handrailing.

The spaces between the grillage beams, and for at least 4 in. all around them, were filled solid with concrete, and the cast iron column pedestals were set on a ½-in. filling of grout, with their planed tops 6 in. below the basement floor.

The 1:3:5 concrete was made with Anderson and J. B. White brands of Portland cement and with stone small enough to pass through a 2-in. ring. The mixed sand and stone from the Thames River was dumped on a platform, cement mixed with it and the mass turned twice by hand. Water was added from a sprinkling can, it was turned again, shoveled down about 4 ft. into the foundation trench, stamped slightly and smoothed on top.

No materials were stored at the site, but all were delivered by carts about as needed. The steel was hoisted by derricks and was delivered in 2-ton lots. It was unloaded, hoisted and erected by one 5-ton steam guyed derrick with a 65-ft. mast and 55-ft. boom, and by two 5-ton steam stiff leg derricks or "Scotchmen," with 75-ft. booms swinging through an arc of 270 degrees. These derricks lifted loads up to 6½ tons. The guyed derrick was like those used in New York and was operated by a Lidgerwood double drum friction hoist.

The heaviest members were handled by special methods. They consisted of three 20-ton 39-ft. plate girders carrying exterior walls and columns in the second story. There are also 11 11-ton cantilever girders in the basement to carry the walls adjacent to the neighboring buildings. The steelwork was assembled without much reaming; in the few cases where reaming was required it was done by a pneumatic drill. The best record for field riveting was 190 rivets driven in one day by two men and a heater, using a pneumatic hammer; three men and a heater drove about 160 rivets a day by hand. No temporary wind bracing was required for the steel framework, but the columns were plumbed by guys run from the top of one column to the foot of another column and adjusted by turn buckles.

Steam for the five derricks and the concrete crusher was made in six independent boilers, one for each. Steam at 80 to 100 lb. for the air compressor was provided by another boiler.

The principal quantities involved in the building include about 8000 cu. yd. of clay and 330 yd. of concrete excavated, and about 2700 tons of structural steel erected. An average force of about 300 men was employed throughout the work. The removal of the old buildings was commenced in 1903. Excavation was commenced in June, 1904. Foundations were built in July. The erection of the steelwork was commenced early in September and finished the last of December, 1904. The greatest weight of steelwork erected in one week was 130 tons. The walls were commenced in December, 1904, and finished the last of May, 1905. Interior construction was commenced in May, 1905, and the building was inclosed October 1, 1905.

The architects were Mewes & Davis of London. The steel was designed by S. Bylander, and erected by the Waring-White Building Company, Limited, as the general contractors for the building. The Columbia Fireproofing Company, London, was the contractor for floor construction; the National Fireproofing Company, New York, for partition tile; Yale & Towne, Limited, New York and London, for hardware, and the Otis Elevator Company, London, for elevators.

Antique Saws.

The saws of the Grecian carpenters had the same form, and were made in the like ingenious manner as ours are at present, says a writer in an English exchange. This is fully shown by a painting still preserved among the antiquities of Herculaneum. Two genii are represented at the end of a bench, which consists of a long table that rests upon four-footed stools. The piece of wood which is to be sawn through is secured by cramps. The saw with which the genii are at work has a perfect resemblance to our frame saw. It consists of a square frame, having in the middle a blade, the teeth of which stand perpendicular to the plane of the frame. The piece of wood which is to be sawn extends beyond the end of the bench, and one of the workmen appears standing and the other sitting on the ground. The arms, in which the blade is fastened, have the same form as that given to them at present. In the bench are seen holes, in which the cramps that hold the timber are stuck. They are shaped like the figure seven, and the ends of them reach below the boards that form the top of it. The French call a cramp of this kind *un valet*. Montfaucon also has given the representation of two ancient saws taken from Gruter. One of them seems to be only a blade of a saw without any frame, but the other resembles a crosscut saw. One may, however, perceive both the handles between which the blade is fastened; the wooden bar that binds them together, though the blade is delineated too near it; and about the middle of this bar, the piece of wood that tightens the cord which keeps the handles as well as the whole instrument firm. Saws which were not placed in a frame, but fastened to a handle, were described by Palladius.

SPECIFICATIONS FOR CONCRETE BLOCKS AND BRICK.

AMONG the papers read at the convention of the National Concrete Machinery Manufacturers' Association, held in Detroit, was one by F. L. Dykema on the above subject. What he had to say regarding concrete blocks is of such manifest interest to many of our readers that we present the following extracts:

The underlying principle of good concrete is that every particle of sand shall be thoroughly coated with cement and that every particle of stone shall be thoroughly coated with the cement and sand mortar, and that the combination of materials shall be such as to reduce the space in the concrete to a minimum. This condition means the highest grade, least porous concrete—usually at the lowest price—and if properly impressed will do away with the idea that the strength of the concrete is dependent upon the amount of the cement used.

In considering the materials to be used, cement is the first consideration. Lack of facilities and knowledge for making tests of cement make it necessary to select a brand of known reputation—always, if possible, continuing the use of the same brand in order to secure a uniformity of color.

Sand is the next element to be considered. This should in all cases be sharp, clean, and free from clay or loam. To produce this condition washing may be necessary, but this in the end becomes an economy through the saving in cement. It should not be finer than such material as will pass through a screen having a mesh of $^1/_{64}$ in.

Under the classification of sand comes any material as is obtained from bank, river or crusher. Gravel, for the purpose of definition, is such material as is retained on a ¼-in. screen, the larger dimensions being dependent upon the class of machine in which it is used. Gravel should vary in size, running from fine to coarse. Crushed stone is the crushed product defined in size the same as gravel.

The Proper Proportions.

A theoretically correct concrete should be made up of sand or gravel, or crushed stone and cement, in such proportions that the finer materials fill the space between the coarser, and the cement paste coats all the materials, sand and stone, fill all the remaining space in the mass. Such concrete would have no voids—would be nonporous —and would require the smallest amount of cement.

A simple parallel to such a concrete may be taken in a stone wall. The stone of which the wall is built represents the gravel or coarser material, and the mortar in which the stone are laid represents the cement and sand.

The amount of mortar required to lay up the wall is dependent upon the size and shape of the stone used. If the stone are of such shape that they can be laid closely so the smaller pieces will fill up the crevices between the larger pieces, the amount of mortar required will be smaller. In other words, the more nearly solid the wall can be made with stone the less mortar and cement will be required.

This is exactly parallel to the making of concrete. If concrete is made up of sand and cement alone, without using stone or gravel, it is equivalent to constructing a wall entirely of mortar.

Theoretically perfect results are impossible in practical work. To attempt to approximate them is the best we can do.

To determine the voids in the sand, or the material to be used as an aggregate, what is known as the "water test" is employed. In preparing for this test the sand or gravel must be perfectly dry. Sand has greater volume when wet.

A receptacle holding a known amount, such as a quart jar, is filled with the material to be tested, sand for example, and into this receptacle is poured as much water as the sand or other material will absorb. The water should be measured. The amount of water absorbed indicates the voids, and also indicates the exact amount of sand which it is necessary to use in order to produce a solid concrete.

In making hollow blocks, if no gravel or other coarse aggregate is used, the result of this test should give the proportions of sand and cement to be used in block manufacture. Average sand will absorb 20 to 30 per cent. of water, indicating from 20 to 30 per cent. of voids; also indicating that the proportion of one part of cement to from three to four parts of sand are required to make a solid block.

The proper selection of sand and aggregate material is important. Care should be taken that the particles vary so in size as to reduce the voids to the smallest amount possible. With this careful selection the amount of cement required to produce good work is greatly reduced.

After careful selection of materials, producing as near as possible the condition described above, the mixing is to be considered. This is next in importance to the selection of materials. It must be borne in mind that "every particle of aggregate must be coated with cement," and this can be brought about by thorough and careful mixing.

Use Plenty of Water.

The quantity of water is largely dependent upon the class of machine used. It is generally conceded, I think, that a wet concrete gains the greatest strength in the shortest time and requires less manipulation in curing. So in all cases it is advisable to use as large an amount of water as can be without injurious sticking. Careful attention to face plates will be of assistance in bringing this about.

Concrete should be placed in the mold in small quantities and should be tamped with a small face tamper, the blows being short and quick. Tamping should be thorough. Proper impression is just as important as proper grading. Additional labor used at this point is more than saved in the cement.

In the wet process the amount of water used is such as will produce a plastic or flowing condition in the concrete, but not enough to wash the cement from the other material. When placing the material in the molds the entire mold is filled with one pouring. No tamping is necessary.

All stone made by the medium wet or medium dry process should be under cover, and kept under cover for at least 10 days, protected from the dry currents of air. If shed room is not available to store a 10 days' output, the blocks should be carried out after the initial set has taken place and covered with canvas, hay or other covering which will retain the moisture, and yet at the same time keep the dry air from circulating around the block. In no circumstances should the block be made under the direct rays of the sun, nor should blocks made by this process be exposed to either sunshine or dry winds while curing.

The blocks should be gently sprinkled as soon as possible after making, that is, just as soon as the cement has set sufficiently that it will not wash. Blocks should be kept wet for from 10 days to two weeks, and should never be removed from the yard for the purpose of being used in a building until they are from 30 to 60 days old. This is very important. A green block will surely crack in a building on account of shrinkage.

In laying cement stone a soft mortar composed of half cement mortar and half lime mortar should be used. This mortar from fine sand free from stone should be butted on the ends of the stone before laying. The stone should be laid in the mortar and worked down. End joints should never be left open until after the building is completed, because when the end joints are filled at this time shrinkage in the mortar is liable to loosen it, causing the mortar to fall out, leaving openings through the wall.

The spreading of mortar is very important, because if mortar is unevenly spread so that it is thicker under one portion of the stone than under the other a leverage is created which under the weight of the wall above is liable to produce a crack in the stone.

In using coloring matter with concrete the color should always be mixed with the cement dry, before any sand or water is added. The mixing should be thorough, so

that the mixture is uniform in color. After this mixing the compound is treated in the same way as clear cement. A very important feature in producing clear colored cement stone is the use of good, clean, light colored sand. Several shades of difference can be made by careful sand selection.

No stone having ties cracked—however slightly—should be allowed to cure. Never put a cracked stone in a building.

Facing, possibly in face down machines, should be made of well graded sand and cement in proportions of two to three parts sand to one of cement.

Properly graded sand will produce a waterproof block without the use of waterproofing compounds or chemicals. Such facing should be a very dry mix, and should be sifted on to the face of the plate through a ¼-in. screen to a thickness of ⅜ in., and the concrete or backing placed thereon immediately.

Sifting the facing on to it softens it and loosens it, so that when the backing is tamped on to it, it is readily incorporated with it, preventing any separation line between the face and the backing.

The selection of the sand for the facing is very important for color and waterproofing. A light colored, perfectly clean (washed if necessary) sand of uniform shade should be used, and it should be made up of well assorted sized particles in order to produce a dense, impervious surface.

Careful use of hydrated lime is now considered safe for waterproofing purposes.

The use of chemicals for waterproofing should be discouraged unless proper demonstration, covering a period of time, shows the safety of the material.

An important question for consideration by the association is the adoption of a system of a standard length and fractions of lengths for stone and brick. Such a standard would simplify construction, in no way interfere with proper architectural effects, and place a more definite proposition before the architect.

In conclusion I would again emphasize the duty of this association in bringing about a higher quality of work by the manufacturer of cement products, securing the co-operation of these manufacturers by demonstrating that it is to their financial benefit to adopt the recommendation of this association.

The Apprentice Boy.

Among the interesting papers presented for consideration at the convention of the National Association of Master Sheet Metal Workers, held in Indianapolis in August, was one by W. C. Johnson dealing with the above topic. What he had to say is of such manifest interest that we present the paper herewith:

The modern apprentice has often proved himself a twin brother to the traditional Irishman's flea. If not exactly of the same species, his fleeing propensity has more than once suggested a decided likeness. The need of the apprentice is unquestioned. He fills a place from the beginning to the end of his career which makes his existence and training a matter of vital importance to the trade. How otherwise can skilled labor be maintained? How during his training can the many and varied services which lead up to the skilled workman, and which are in their way as important to the conduct of the trade as are the services of the trained workman, how shall these services be performed unless the apprentice to whom they belong is in evidence?

The important question follows, How can we secure, retain and develop the apprentice until the issue is realized in the workman who honors his trade and in turn is honored by those who have the benefit of his services? Experience has taught the difficulty of the answer, and at best we cannot attempt more than simply suggest something which may help in the solution of the problem.

The parties interested in the development of the apprentice have so much to do with the successful completion of his career that we shall confine ourselves in this paper to these parties.

1.—The Apprentice Himself.

He must have a two-fold conviction that he will be an honor to the work and the work honor him. The boy should feel that he is capable of learning the trade and show it in his interest in its details and in his determination to master them. Such a spirit is an honor to any station. The trade itself must in his view be worth his pursuit. A trade which has no attractions for a boy is the worst pursuit he can follow. His apprenticeship degenerates into one continuous protest against service, and if continued prophesies final failure. For successful careers give us the boys who enter the shop with the feeling that they will both give and receive. Give us a high purpose to succeed and receive in a trade knowledge the possession of which is matter of rightful pride.

2.—The Parent or Guardian

is an important factor in the development of apprenticeship life. He should stand between the boy and his troubles. In his ignorance and inexperience the boy sometimes needs the counsel and the will of authority to hold him in place. The impulsive spirit of youth must find its check in the advice of those whose settled convictions and habits make them competent to steer the lad until he has passed the point of danger. That boy is to be pitied who has no such authoritative counselor, and whose lament in later life has sometimes been that he was left to act for himself.

3.—The Associated Workman.

In all pursuits there are men of opposite extremes in their attitude toward their associates. For that workman who refuses the apprentice his kindly counsel there should be no place, save as necessity requires his services. The narrow, unsympathetic, jealous, persecuting spirit of some workmen toward the apprentices who will take their places when they are dead leads one to come very near hoping that the change would come soon. On the other hand the man, who is also a workman, and who is "a man for all that," whose clear recall of his own days of struggle and whose heart sympathy for his embryo fellow craftsmen fans the fire of resolve in the halting boy's heart and gives him a new outlook as to his future possibilities, he alone meets his accountability in the class called to work for the boy's upbuilding.

4.—The Employer

may play a most important part in developing the apprentice's life. To the employer the final appeal is made. His word is presumably law. He is supposed to direct service and whatever will most effectively secure it. Hence the consideration of the manipulation of tools is not his only duty, but also along with this, supervision of moral character. Character often puts a premium upon efficiency which lack of character discounts. A surly, dishonest, foul speeched workman, whatever his skill, may pass current with those of his class, but if we mistake not will be rejected by a still larger class whom it is the employer's highest interest to serve. The employer therefore who trains his apprentice not only in mechanical labor, but in the spirit with which he performs it, will win both for the boy and himself all the time.

There is no good reason why this quartette—the apprentice, the parent or guardian, the associated workman and the employer—should not unite in such harmony as to give new meaning and dignity to apprenticeship life. This paper suggests their work in part only. That part rightly performed by each participant must eventuate in a product which from the best standpoint is a workman of whom no one need be ashamed.

Hand Ball Court of Reinforced Concrete.

The first outdoor reinforced concrete hand ball court in America has just been erected on the grounds of Columbia University at 116th street and Broadway, New York City. The court consists of a wall 80 ft. long, 15½ ft. high and 2½ in. thick, with a buttress every 20 ft. which is also 2½ in. thick. In this wall no structural steel is used, the reinforcing consisting of truss metal lath, the sheets of which are temporarily wired to temporary studs and the joints of the sheets are broken to insure a perfect bond. The wall is built the same as truss metal partitions in buildings and is a striking departure in outdoor work.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

OCTOBER, 1906.

Men Needed in the Building World.

The generally satisfactory business that has been enjoyed in all lines of industry has been shared in very large degree by those connected with the construction of buildings. With the increasing demand has also come a closer surveillance of the work done with the advance in the requirements which is in keeping with the progressive time. Those who are conducting business as mechanical tradesmen have long since passed the place where they can secure the number of skillful workmen which are needed. There is seldom any clash or disagreement with the class of workmen who are most in demand. They need no organization to secure for them a very satisfactory remuneration. Men who can take the explicit and detailed instructions from their employers and carry out of a piece of work are held in high esteem and taken care of with consideration by their employers. The only trouble reported is to find a sufficient number of such men, as they are continually passing to higher planes. Young men who have not only acquired a good education from graduating from the high schools, but who have had the hardy manhood to engage in some one of the mechanical trades, rapidly advance from the rougher stages of work to that where intelligence and education increases the value of their handicraft. When such men continue to study along the lines which naturally develop to the inquiring building mechanic and improve their evenings by a course in some good engineering school, they are fitting themselves for the field which is ready for their arrival. In all of the larger building and contracting establishments where an engineering staff is employed the advent of such young men is welcomed. They are offered an opportunity for acquiring additional information, and are really hurried to make the necessary preparation to fill more important and lucrative positions. The difficulty is to find men who are qualified by education and practical training to take the positions which are open with concerns who must have competent engineers to design and plan the work and prepare the drawings and specifications for it, to be carried into effect by the corps of employees and workmen maintained by the house. At the present time numerous inquiries come to us for men who have passed early manhood and have the matureness of character, information and experience which will make them invaluable in the important positions which await them. Those who have business acumen in addition, and who have not allowed their scope to become cramped and confined by the discipline and education of the shop, but who apply broad common sense to all questions, have a natural courage to take the responsibility to meet and dispose successfully of both practical problems and the economic problems presented by the shrewd and often not too scrupulous customer. Common sense makes a clear, courageous head, and when it is backed by practical training and education there is a demand for it at good, round salaries.

Advancing Fire Insurance Risks.

A radical advance in fire insurance rates has resulted from the tremendous losses sustained by the companies in the San Francisco disaster. This advance should have a marked influence in making more general the use of automatic sprinklers and other precautionary appliances, which are necessary in industrial or other buildings if the owners are to have the cheapest forms of insurance. The increase of rates does not apply to any risk where sprinkler systems are installed, either in what are known as the conflagration areas of the cities or in neighborhoods where there are no waterworks protection. These two classes of territory are the only ones affected. Mercantile and manufacturing properties located within conflagration areas have had their rates increased from 12 to 15 per cent., while what are known as unprofitable risks, located away from waterworks protection, have had to take an advance of 25 per cent. In neither instance, as has been stated, is property protected by automatic sprinklers affected. The fire insurance companies are being subjected to a great deal of censure because of these higher rates, but these critics overlook the fact that with such a tremendous blow to their resources, in many instances not only wiping out the surplus but causing stockholders to be assessed, provision must be made against the possible contingency of another great conflagration. Premiums on existing policies are not affected of course, and excepting in those cases where policies are immediately maturing old rates may be procured by equipping property with appliances for fire protection according to the accepted rules and standards of the insurance companies. The demand for all forms of fire protection, including sprinkler systems, is very great at the present time, and probably it would be impossible to procure the immediate installation of an extensive fire protection system to forestall the advance in rates which must come with the taking out of new policies in the immediate future. But fire insurance companies make deductions in premiums of existing policies if properties are safeguarded against fire, by means of sprinklers or otherwise, after the policy is issued, so that the larger premium resulting from the recent advance may be made to be a temporary one.

Cost of Fire Protection.

The initial cost of adequate internal fire protection in an industrial or commercial building is necessarily large, but there are few who have thus equipped their buildings who would be willing to say that the investment is not a good one. The difference in insurance rates is great, reckoned in percentages, and this is not by any means all the return that the investment secures. Many fires which might otherwise be serious are flooded out in their infancy by automatic sprinklers. Not only do insurers who suffer from fire in their establishments seldom find their loss covered when the insurance is adjusted, but the actual loss of property is usually greatly increased by the loss which comes with the shutting down of a business, the necessary cancellation of orders and the dispersion of customers, who must go elsewhere for their goods, some of them to stay away permanently. Organization is disrupted, and it may take a long time to get the business back to where it would have been had there been no disaster. This is the real value of the fire protection investment, as a safeguard against fire rather than as a saving on insurance premiums, though the latter item is always of importance. It has

been well said that the industries of the country owe much to every factor which tends to impress the value of the fire protection upon manufacturers, and of course the same thing is true as applied to commercial interests. If an advance in insurance rates stimulates business men to save premiums by equipping their property with modern appliances for extinguishing fires, the advance may be characterized in the long run as a beneficial influence.

New Style of Bank Building.

Considered from an architectural point of view one of the most interesting structures intended for banking purposes will be the new half million dollar home of the Importers' and Traders' National Bank, which will occupy the site of the present structure at 247 Broadway, New York City, the entire lot being 25 x 100 ft. According to the plans which have been drawn by Architect J. H. Freedlander, the building will be six stories high, five of which are intended for immediate occupancy, the sixth being a provision for future growth. White marble will be used for the exterior, and the window frames will be of bronze with grilles on the first and second floors. The entire building is fireproof, with steel skeleton frame and tile and concrete floor arches. The design of the exterior is simple and without embellishments of any particular note, the main purpose being to produce a facade which, by its dignity, shall be expressive of the character of the institution. With the exception of the treatment of the directors' and officers' rooms, which will have a wainscoting of Circassian walnut, the entire finish will be of marble, plaster and kalsomine. Owing to the limited ground space which the building will occupy, the note teller, receiving teller and collection clerk will be on the first floor, with the departments of paying teller, balance and individual bookkeepers and assistant cashier on the second floor, and the departments of discount, loans, general bookkeepers and officers' rooms on the third floor. In order to connect the departments quickly and overcome the seeming handicap of not being on the same floor, the elevators in the center of the building will run at such speed, it is intimated, as to make a car available on the first floor every half minute.

◆

Building on the Percentage Basis.

The scheme of conducting building operations on a percentage basis continues to invite discussion in the trade, and supplementing what has already appeared on the subject in these columns, an architect whose practice is large volunteers the statement that for the past ten years all contracts awarded by him have been on a percentage basis, figured on the actual cost of all material and labor that entered into the work. The results of his experience have convinced him that this method is much more satisfactory than to let contracts for a given sum. He finds that while the owner has no contract in advance for the completion of the building at a fixed price, the expenditure is always within his control, and verification is possible whenever desired, says *The Inland Architect*. Itemized bills for material and labor are rendered from time to time, and he has the satisfaction of knowing the amount and kind of supplies that are being used in his building. The always annoying item of extras is eliminated, and changes required during the progress of the work are made with the least possible expense. The owner feels throughout that his interests and his alone are paramount. There is no temptation on the part of the contractor to use cheaper materials than are specified, nor to slight the work, as he is assured of a fair profit.

The contractor by the percentage plan is not liable for unexpected advances in prices, nor for penalties for delay. There are avoided all the uncertainties and risks that are ever present with a lump sum contract, and the contractor is free in mind to push the work at every point in furtherance of the quick completion of the building and the best interest of the owner. The contractor would not likely attempt to manipulate vouchers to show fictitious cost prices as, if he were so disposed, the knowledge of the architect would be a certain check upon such practices. The architect mentioned encountered opposition at first from the owner, who has the natural desire to know his full obligation at the start, but this has been overcome in every case when the owner has had brought to his attention the probable saving in cost and the many substantial advantages to him from the percentage basis. The contractor by such an arrangement becomes, in a degree, the agent of the owner, and harmony between all parties to the construction is fostered. The usual position of the architect as a buffer between the owner and the contractor ceases.

◆

Heating a Cottage.

In discussing the question of heating a village dwelling by means of stoves Dr. Harvey B. Bashore states that the halls are usually cold and, in addition, even in the rooms where stoves are placed the floors are from 6 to 8 degrees colder than the temperature 4 or 5 feet above, a fact easily proved by experiment. As a consequence one's feet are just so much colder than head and shoulders. These two defects, cold halls and floors, are certainly factors in producing catarrhal inflammation of the throat and nose, if nothing worse. To remove these defects to a minimum it is necessary to alter somewhat the construction of the rooms. Every one knows the value of the open grate, not so much as a heater, but as an equalizer of room temperature, and herein lies our remedy. Every room should have such a grate, or its equivalent, simply an airshaft connected with the chimney and opening into the room at the floor level. An airshaft so arranged and of suitable dimensions answers almost as well as an open grate and furnishes the means whereby rooms may be heated very well with ordinary stoves.

When a room which has no fireplace is heated the heated air rises and spreads along the ceiling in a thick cloud, and if a window is opened the warm air rushes out before it has done much good; if, on the other hand, there is an open grate, some of the hot air escaping up the chimney creates a partial vacuum; this, consequently, creates in the room a movement toward the opening, and the upper heated air is more diffused about the room, making the temperature more uniform.

The halls, whether they contain a stove or not, should have an airshaft, for it will assist somewhat in "sucking out" the heated air of the adjoining rooms. A small oil heater placed in the lower hall will be of assistance in keeping the hall temperature at the right point.

◆

A Record in Caisson Sinking.

Work upon the foundations of the new United States Realty Building, which is in process of construction on Broadway between Cedar street and the Trinity Building, has been pushed forward with unusual vigor by the Foundation Company of New York City, and on August 22 the last of the 87 caissons had been sunk to bed rock, 75 ft. below the level of the street, at a cost of about $6000 each. The 87 caissons were sunk in a period of 60 days, which establishes a record for speed in this kind of work. The previous record made by the same company on the foundations for the present Trinity Building was the sinking of 50 caissons in 51 days.

◆

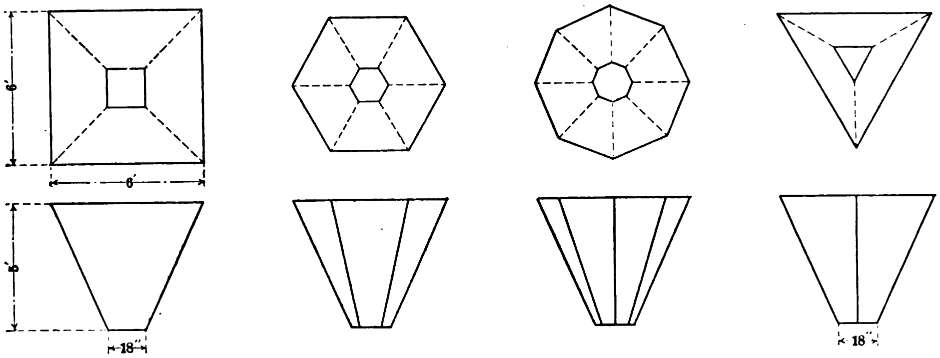
IN discussing the term penny as applied to nails and their length in inches, as indicated by that word, a correspondent of *Wood Craft* states that the 3d. is 1¼ in. long, the 12d. 3¼ in., the 16d. 3½ in. and the 20d. 4 in. long. From the 3d. to the 10d. ¼ in. is added to the length for each penny, thus making the 10d. nail 3 in. long.

CORRESPONDENCE.

Bevels for Hoppers.

From J. A. K., *Detroit, Mich.*—Please allow me a little space in the Correspondence columns of your valuable journal to present to the many readers a question regarding the finding of bevels for various hoppers. I inclose sketches showing four plans and elevations of a square, a hexagon, an octagon and an equilateral. The dimensions of the first or square hopper apply to them all in their extremities. Now, brothers, what I want to know is the complete bevels for each. I presume one rule applies to them all, and what I mean by complete is the side, the miter and horizontal bevels; also the bevel for backing. I hope to see in the near future various methods presented, either geometrical or involving the use of the steel square.

I take this occasion to thank "L. H. H.," "S. A. T." and "M. W." for their efforts regarding "Bevels of Jack Rafters for a Deck Roof" in late issues of the paper, which I greatly appreciate.



Bevels for Hoppers.—Diagrams Accompanying Letter of "J. A. K.," Detroit, Mich.

Criticism of "Building Methods in England."

From J. Stewart Macdonald, *Washington, D. C.*—I have been a reader of *Carpentry and Building* for just one year and like the paper very much; in fact, I would not be without it for a great deal. As a stranger to the work of this country I have derived much benefit from a perusal of its columns, but when I see accounts of lightning rate shingling, as described by Western Builder, I let them go for what they are worth, and when I read, as I did in the September issue, of "Building Methods in England," I conclude there is nothing to be learned by such, especially when it has a tendency to convey a false meaning to readers by the nowadays misapplication of the word "English" for "British." I presume your correspondent, "W. J. Blackmur," to be an Englishman or English-American. I do not like the sarcastic spirit of his article, for after he runs down the methods of English builders (not British) and cites the "disgrace" of having 80 year old houses covered with pantiles, situated in a district through which passes a principal railroad from the Continent, he says, "We Britishers," &c. The like of such is the Englishman all over. Had it been an honorable thing of which to tell us it would have been "We Englishmen." Just as in the unrighteous war of South Africa, English newspapers had the accounts "English victory" or "British repulse." What disgrace is it to a nation "We Britishers" to have houses 80 years old? Right here in this city, the capital of this great country, there are houses being built by real estate people employing labor known as "Maryland and Virginia farmers." These buildings, I am bound to say, will be more dilapidated in 20 years than the 80 year old ones to which your correspondent refers.

With reference to white fir joist alleged to be used by the "good big profit builders," I might say that in my 10 years' experience bossing jobs on the other side of the "herring pond" I never saw a white fir joist used, but what I did use, even on Glasgow tenements, was better far than the best joists I have handled on this side of the water. This is not said for the sake of argument, but it can be proved nevertheless. The Mother country, with all its old fashions in building and its being 500 years behind the times in the eyes of people for whom it has no use; with all these drawbacks I say it does not have as many building collapses, railroad smashes and other accidents in a year as in one large city in this country in a month. People who leave the Mother country and come to America with feelings hard and sarcastic toward the old country are usually those whom the country is richer without and with whom this country can never be made better. They are never good citizens of America, and in many cases they are people for whom the law of the Mother country is looking.

When your correspondent lectures in future through this or any other building newspaper about "Building Methods in England," I hope he will not connect Edinburg, Glasgow and other large cities of Scotland by his "We Britishers." If the buildings in England are so "distinctly ugly and unsuitable for modern civilization" by having tile roofs, why do the most up to date people of Washington, D. C., cover the roofs of their houses with tiles of a slight improvement over those referred to by Mr. Blackmur? Why do so many American tourists visit the old country and return to this one with better ideas in many cases of how they will build their future homes?

Since all men are brethren, and since America has shown Great Britain, and England in particular, that she can run this country without the aid of any other nation, we should say "Hands off," and endeavor in every way to live together in peace. What we Scotch-Americans want to read in *Carpentry and Building* is the more practical and technical terms as they ought to be used in American building construction and other things beneficial to the working craft, for such valuable information will help some of us in the work and speed the time when man to man the world o'er shall brothers be.

Making Balloon Frame Construction Rat Proof.

From M. B., *New Brighton, N. Y.*—I would like to call the attention of the readers of the paper to what seems to me to be a nuisance in connection with frame buildings, and that is the running up and down within the walls and between the floors and ceilings of rats and mice. It is no pleasure to lie in bed at night listening to the frolicking of these creatures, arousing one's ire to such an extent that a shoe is fired in the darkness in the direction from whence the noise appears to emanate, and to learn to our sorrow that a door panel or mirror has been broken rather than any harm done to the sleep disturbers. These pests, it seems to me, can be prevented very easily from overrunning the house if the flooring be well fitted between the studs and around the plumbing. And here the plumber ought to do his part. He should keep the hubs of waste pipes when they come near the floor either between the beams or have the entire ball of the hub well above the floor, with all pipes

A THREE-FAMILY DWELLING ON THORNTON STREET, ROXBURY, MASS.

GEO. PRESCOTT CONNOR, ARCHITECT.

Supplement Carpentry and Building, October, 1906.

A CEMENT-COATED RESIDENCE IN LOS ANGELES, CALIFORNIA.

EISEN & HUNT, ARCHITECTS.

Supplement Carpentry and Building, October, 1906.

at least 1 in. away from the baseboard, where it passes through the floor, so that the floor may be tightly fitted around the pipes. Too little attention is paid to this feature by the architects in their specifications, and consequently by the contractors.

Some "Mission Style" Furniture.

From An Old Subscriber, *Lancaster, Pa.*—Will the editor kindly publish in the columns of the Correspondence Department some styles of "Mission" furniture, more particularly a reclining chair and a table?

Answer.—The following particulars descriptive of a reclining chair and table, suggested by the correspondent above are furnished by Paul D. Otter, who says: It is supposed the table wanted is for general use, and while Fig. 1 is classed as a library table it more frequently finds its place in the general living or sitting room, and as shown offers space for every member of the family to gather about it. The size of the top is 28 x 48 x 1¼ in., the hight to the top is 29 in., and the legs are 3 in. square and are set 1¼ in. from the corners. The bottom shelf is 10 in. from the floor, and on the middle of the shelf may be placed a book "buck" or trough, as shown. The latter is formed by two boards jointed to fit at right angles, having 5½ in. to show on the inner face to receive the books. One full drawer on the top may be put in, or corner drawers as shown, pulling from one side, with a similar space provided on the other end without the drawer, open at the ends and side. This is a handy shelf upon which to rest an unfinished book and other interrupted work.

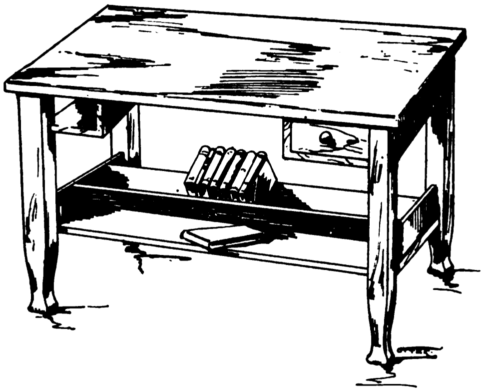


Fig. 1.—General View of Table.

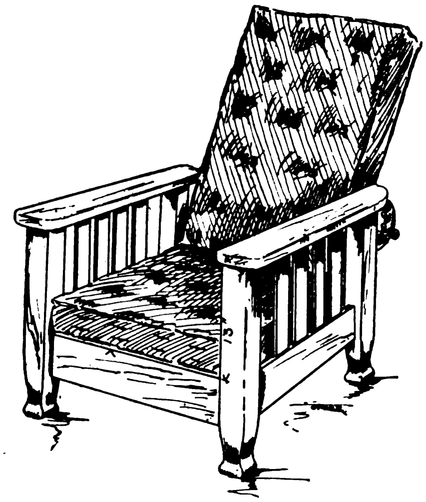


Fig. 2.—Reclining Chair.

Some "Mission Style" Furniture.

The correspondent calls for a reclining chair, but inasmuch as there are many reclining chairs, good, bad and indifferent in their construction and appearance—most of them covered by patent—it is thought the Morris reclining chair conforms properly to the "Mission Style," and in this form of chair inventive ability may be shown in giving greater comfort and range of position. A footrest may be provided, the front of which would be a portion of the front rail when not in use. This withdrawing front may have table slide rails and small drop legs, which fold within the slide rails on the back of the front rail; a footrest may be properly padded on the top of slides.

As to the back adjusting, most every one is familiar with the open rack secured at the bottom by hinges to the outside edge of the back cushion rail. The various adjustments are made by a loose projecting metal rod placed at choice on the four or five hooks within a curved metal bracket, as shown. A simple and primitive way typical of handicraft work is to extend arms 7 or 8 in. beyond the back post and insert on top four projecting pegs for the metal rod to support the back.

This chair frame is built "on the square" all around, remembering to saw the finished back legs 1¼ in. on top before cutting the rail mortise holes, thus providing for proper sitting angle for such chairs. The posts are 3 in. square, the rails 1 x 5 in., and when making the plan drawing provide for the seat rails. Have them measure 21 in. square on the inner face, with the posts set in not more than ⅝ in. at the corners, so that they will not crowd the cushion too much. Cleats should be nailed ½ in. from the top edge of the seat rails, upon which a thin board or veneer filling is to be nailed for the seat cushion. The latter is 21 in. square and the back cushion 21 x 28 in., both filled square cornered to a thickness of 4 in., a combination of tow and horse hair, mostly hair, giving the most durable filling. Leather bag cushions, as previously described in various articles under the head of "Cabinet Work for the Carpenter," are particularly appropriate for this craft pattern of chair.

What Material Is Best for Roof Covering.

From B. F. H., *Newark, N. J.*—Anent the question of "W. T." of Richmond, Va., in the issue for August, there is one point that bears on the problem to which we all pay too little attention, and it is this: No matter for what purposes a building is used there are always times when the outside temperature is lower than that inside, and at such times condensation of the moisture in the air will take place.

Of course the quantity and quality of such condensation are affected by the use of the building, and the consequences as to the effect upon the roof covering are also affected thereby. But it is obvious that the common sense way to handle this matter is to provide ventilation under the roof covering. Any and all roof coverings are improved by free circulation of outside air thereunder. Especially is this the case with metal roofing, whether of tin, zinc, lead, iron or copper, as all these metals are applied in thin layers and are quickly affected by the lower outside temperature chilling the inner surface and inducing condensation from the inner air.

Furthermore, all metals are subject to expansion and contraction to a great extent, causing breaking of seams and cracking of the metal. This also is in a large measure obviated by providing free ventilation thereunder. To come to the point: All roofs covered with metal should be provided with an air space underneath, connected with two or more ample ventilators at all times and under all conditions.

From D. M. G., *Manchester, N. H.*—Referring to the inquiry of "W. T." (August issue) regarding the wearing qualities of a tin roof, much depends, of course, upon the nature of the business carried on. If the business contemplated is that where steam is used and a vapor is emitted a metal roof is not desirable, but if a comparatively dry roof is contemplated use a sized paper under

the tin and use linseed oil paint upon both sides of the tin, soldering with rosin, and there is not a better roof laid.

Deadening a Ceiling.

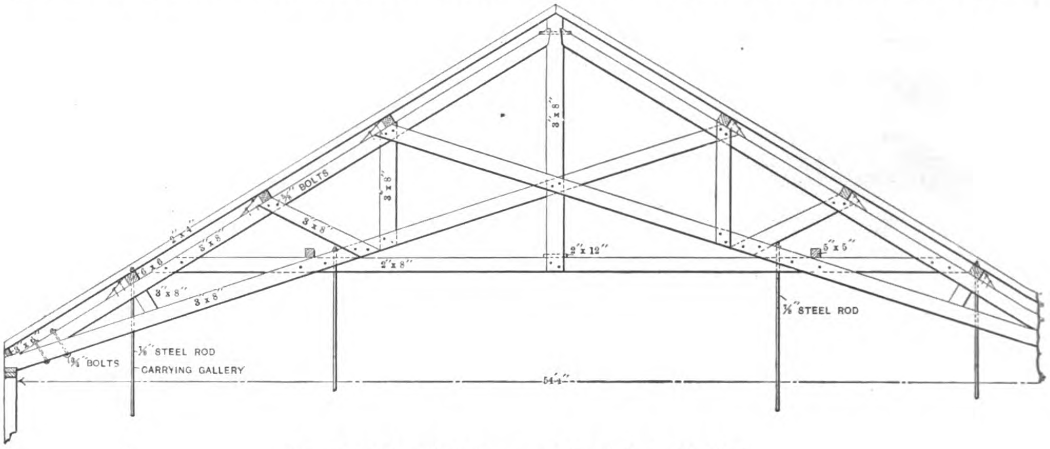
From J. M. B., *Monroeton, Pa.*—I have a job of ceiling a hall for a secret society and want to deaden the sound on one side next to a public stairway. Will some of my brother Chips tell me through the Correspondence department of the paper how they would manage it?

Recipe for Liquid Glue.

From ECHINUS, *Wilmington, Del.*—Your correspondent "A. D. C.," Johnsonburg, N. Y., asks for a "tested liquid glue." Let him try mixing a good grade of glue in acetic acid; just enough of each to make a good glue body —not too thin. This glue should be kept in glass or porcelain—not in metal. I use a commercial grade of acid at 70 cents per gallon. With this glue I built a curved stair string out of seven pieces of ⅛-in. veneer 20 in. wide and 14 ft. long, a problem out of the range of possibilities with heated glue and ordinary appliances.

Truss Roof for Club House.

From A. E. C., *Vancouver, B. C.*—I am sending an elevation of a scissors truss roof which I designed for the Vancouver Athletic Club Building, finished last June, and which may be of some interest to the readers of *Carpentry and Building*. This truss roof covers the gymnasium portion of the structure, which is 54 ft. 4 in. x 109 ft. with 19 ft. walls on which the trusses are supported. The walls are of 2 x 6 studding, spaced 16 in. on centers, and the trusses are 10 ft. apart. They are supported by 6 x 6 in. posts 19 ft. high. Adjoining the building is an addition 25 x 109 ft., two stories high, with flat roof. All timbers in the trusses are Washington fir, edge grain and bolted together. An inspection of the elevation will show that the sizes of the various members are given.



Truss Roof for Club House.—Scale, ⅛ In. to the Foot.

The roof is covered with No. 1 cedar shingles, and is sheeted solid with 1 x 6 V-point fir dressed on the under side. All truss timbers are double dressed and paneled. In the gymnasium floor there is a running track 10 ft. from the floor and 6 ft. wide, supported from trusses with ⅞-in. steel rods with heavy washers and nuts on each end. The object of putting this plan before the readers of the paper is due to the fact that I, as well as others, may derive much knowledge from the views of different practical men on this line of work. The amount of snow here is very little that we have to contend with and the wind is very light, and I claim that it is not altogether the size of the timbers used in this form of work that affords strength, but the way the members are framed and put together. There is no man infallible, and in order to make progress we should all be willing to learn from those whom we see to possess superior knowledge to our own.

Condensation on Under Side of Roof.

From C. F. S., *Trenton, Tenn.*—We have in our town a cotton mill about 40 x 200 feet in size, two stories high. The building is brick, covered with tin and heated by steam. The upper story is not ceiled. There is a 12-inch ventilator every 20 feet along the comb of the roof. We have been called on to suggest some way by which to stop the hot air or steam from condensing on the roof and dropping back on the machinery, thereby causing the machines to rust. The condensation is worse on a frosty morning than in extreme cold weather, and seems to be worse at the south end and on the east side, where it is more exposed to the sun early in the morning. We kindly ask the practical readers of the paper to suggest some way by which we can stop this trouble.

Setting Door Jambs and Hanging Doors.

From OLD CHIP, *Highland Falls, N. Y.*—With 37 years' experience behind me and the volumes of 18 years of *Carpentry and Building* on my book shelves, it is very amusing to read some of the letters appearing in the correspondence columns of the paper. For instance, the letter of "P. C. D." in the August number. I take it from his letter that he is a young fellow living in a small town. If so, I should advise him to get out and travel around for a couple of years so that he might learn the methods of more experienced hands. It will certainly pay him in the end to do so.

However, I will give him my method of setting door jambs and hanging doors. I have worked alongside of some pretty good men, but have never yet met one who could "beat me out" on setting door jambs provided he set them true. I take a strip of even width and the length my door is wide and try the floor to see if it is level. If not, I cut one side of the jamb as much shorter as the floor is out of level. I then put my jambs in the opening and nail one side, taking care to get it plumb and straight. A long plumb rule or straight edge and level is what I use. Next place the strip with which the floor level has been tested on the floor between the jambs, wedge the bottom of the other up to it and nail it. This done, I wedge up the top and get the jambs out of wind using the straight edge again to get it straight. If one is careful in leveling the floor, in cutting off the jambs and in setting them plumb, the head is bound to come square. The correspondent may rest assured that he will be surprised at the rapidity with which he can set them after once getting the knack of it. I have set three pairs in this manner while other carpenters were setting one.

The method which most workmen use is too slow. They nail the jambs together, measure down from the top an equal distance on each side and nail on a strip. They then proceed to set the jambs up and level on the strip, while at the same time they scribe the bottoms. I am able by my method to set one pair or more while they are getting ready. I do not pretend to be a rusher,

although my fellow workmen say that I am. I simply use my head and eyes and do things the easiest way.

In hanging doors I joint the hinge side first, giving a slight bevel, using the eye to get it straight. I try it to be sure it is right. Then I take the width of the top and bottom and plane off, all the while using the eye to get it straight and give a little bevel. Having my saddle fitted and nailed down, I set the door in place and scribe the bottom to fit the saddle. After cutting off I set the door in place again and mark the bottom on both edges. I line it off with the straight edge and cut off.

Now I am ready for the butts, which I let in flush with the door and jamb. The door is then hung. If a little attention is paid to letting in the butts they will not need any pasteboard or wedge behind in order to make the door hang right. I have seen men fiddle around for half an hour after putting on the butts in order to get the door to swing without binding. The reason for this is that the butts were not properly let in. Of course they were ignorant of the real cause and laid it all to the butts not being made right.

Now, boys, do not judge the "Old Chip" till you have tried his method, and if you find a better way let us know, for we are always willing to learn.

Short Cuts in Roof Framing.

From L. H. H., *Vincennes, Ind.*—I have been reading the Correspondence in the current numbers of *Carpentry and Building*, and would like to call together "J. T.," Trenton, N. J.; "C. C. H.," Brookville, Pa., and "A Constant Reader," Mt. Vernon, N. Y., and say in the language of the Scripture: "Come, now let us reason together." At the outset allow me to request that no one shall imagine that I consider myself extra smart, but by hard, bitter experience I have learned some things. First let me remark that when I served my time my boss educated me in roof framing largely by the "cut and try" rule, which rule I never would sanction. The first house I built for myself I determined to frame every bit of it at my shop. I was bound to "make a button or spoil a spoon." The parts went together, but it was only a small half pitch four gable roof.

Next I attempted stair building, using somebody's books, I have forgotten whose. At any rate, I built stairs much as a parrot talks—just what I learned. One day some forgotten correspondent to *Carpentry and Building* illustrated his method of hand railing by laying out the plan on stiff cardboard, which, by cutting along the lines and folding the paper, showed not only the plan of the rail, but the rail itself in position. From the day I read that article until the present moment I have been absolutely indifferent as to whether I had a drawing to frame any description of roof or not.

Now for a start, let us take a piece of heavy paper, Fig. 1, and draw thereon the line A B of any length, which line we will regard as the base of a rafter. Next raise a perpendicular B C, which is the rise of the roof. Connect C with A, which represents the rafter. Next drop a line from B to D, making B D equal in length to A B; connect A D, which is the base of the principal rafter, which, for the benefit of "Constant Reader," it should be remembered is always as many times 17 in. as A B is times 1 ft. Next, at right angles to A C, set up the line C E equal in length to A B and B D. At right angles to A D produce the line D F equal in length to B C; connect A F, which if correct will be exactly the length of A E.

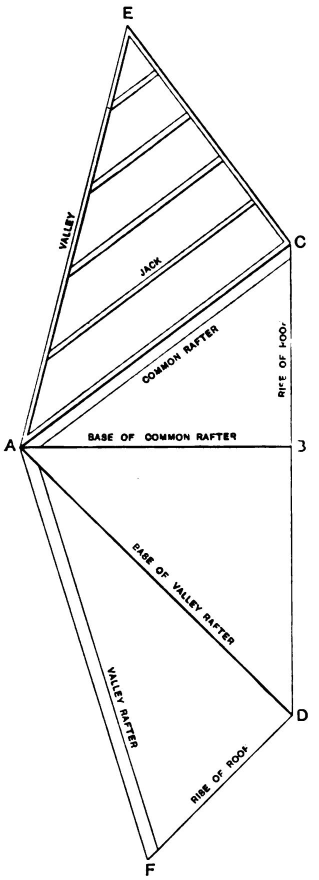


Fig. 1.—Laying Out the Rafters.

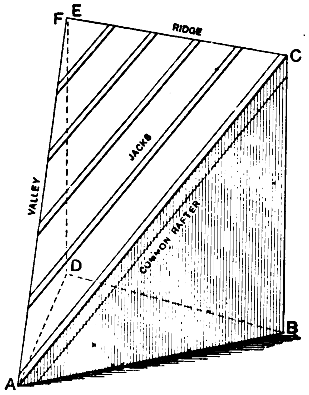


Fig. 2.—Cardboard Model of Jack Rafters in Place.

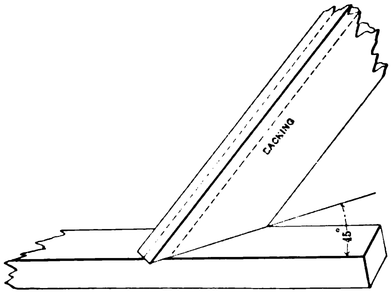
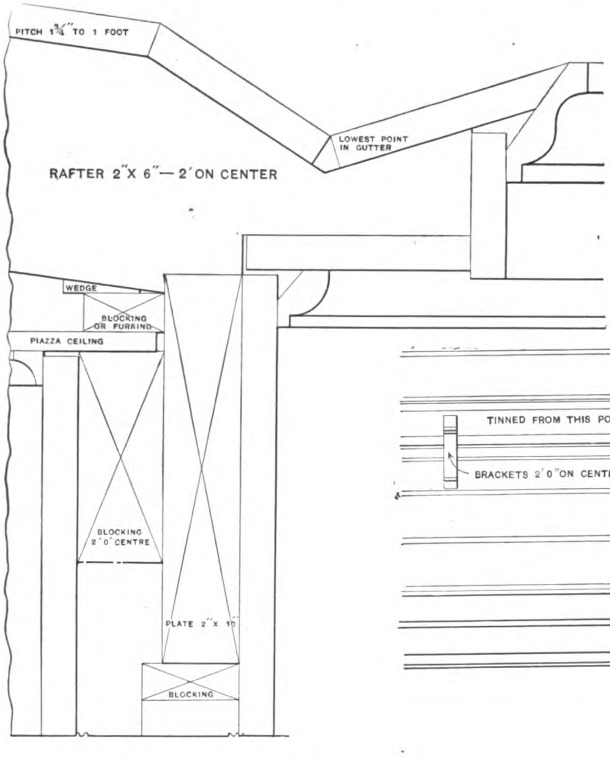


Fig. 3.—Backing the Hip.

Short Cuts in Roof Framing.

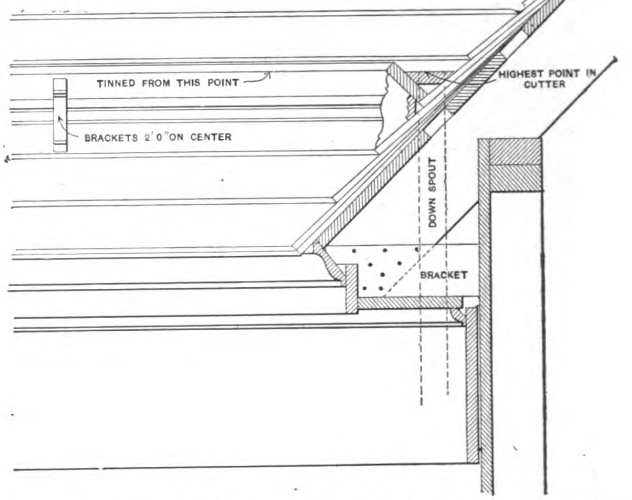
Now with a sharp knife cut out the figure as shown and score the lines A B, A C and A D so they will fold easily. Lay the triangle A B D on the table and prolong E to F, when you will find your roof framed, raised and ready for inspection, as shown in the perspective, Fig. 2. Hence we find that the framing of any roof of any pitch, or of two or more pitches working together, resolves itself into the very simple problem of laying out two or more plain right angle triangles with the steel square.

In framing half pitches the length of the common rafter and the base of the principal rafter, both being an angle of 45 degrees, are of the same relative length to the base of the common rafters, namely, 17 to 12 in.; hence every cut on the square or half pitches can be made with the figures 12 and 17 on the square, and is so simple I have not touched upon it. Here are the triangles to lay out: The base of the rafter by the rise of the roof gives the rafter; the base of the valley rafter by the rise of the roof gives the side cuts on the valley rafter; the length of any rafter in a roof of unequal pitches by the base of the other rafter when the combs intersect at equal hights will give the length of the valley and the cut of the jacks on top, the side cut being the same as the first mentioned rafter. The backing for any hip rafter is quickly obtained by sawing a small piece of stuff to the cut of the bottom of the valley or hip rafter and laying it across another piece at an angle of 45 degrees, as shown in Fig. 3 of the sketches.



Detail of Piazza Cornice, Showing Flat Roof Gutter.—Scale, 3 In. to the Foot.

TINNED 20" WIDE TO THIS POINT



Detail Showing Construction of Gutter on Roof.—Scale, 1 In. to the Foot.

Gutter Construction on Roofs.—Details Submitted by C. A. Wagner.

Gutter Construction on Roofs.

From C. A. Wagner, *Port Jervis, N. Y.*—In the March issue of the paper I intimated that I would defer my comments on gutter construction of roofs until a later date, and as "J. E. N.," Leland, Ill., draws attention to the matter in the August issue of the paper, I inclose herewith some sketches with a few remarks which may prove of interest. In constructing a gutter in accordance with the details shown there is presented a solid roof of shingles just the same as though there was no gutter on it. My theories are that in case of a hole or any leakage or the rusting out of a gutter there is a roof below to protect the interior of the house, and the water cannot wet through until the shingles are gone. This kind of a gutter is very easily put in place and with less labor than any styles that are placed on a roof. The details which I show can be used on any pitch of roof; also in connection with level or rake cornice, as may be desired. I would advise that the lower side of the tin be always well painted and the upper side before laying. I would also favor striking a line for the first row of shingles on the gutter tin and giving above line a second coat before the shingles are laid. I do this painting when we are laying the shingles, placing them directly on the wet paint and nailing them well up in the upper edge of the tin work, as far as the shingles will permit.

I also inclose a detail of flat roof gutter, such as the porch, &c., which shows an easy way of doing the work with the least amount of labor.

My idea is that gutters placed on shingle roofs are not altogether the best practice, as they will sooner or later prove a bad feature as regards leaks, but if gutters must be placed on roofs or we have a client who so desires the gutters set. I should say place them as indicated in the sketch inclosed. I would lay the four lower courses first, then place the gutter on the roof, laying the gutter tin 20 in. wide, then strike the line the same distance as though there was no gutter on the roof, and proceed in the regular way with the roof covering. My plan may not be as good as some of the brother craftsmen's among the readers of the paper, but it will at least start a discussion of the subject. I would very much like to see the ideas of others touching gutter construction fully illustrated and explained, as we can all learn something, at least I so think, but will leave it to others kind enough to bring forth details, &c., on which the readers may comment.

Finishing a Yellow Pine Floor Without Waxing.

From an old subscriber, *Lancaster, Pa.*—Will some of the many readers of this journal kindly favor an old subscriber with a cheap and practical method of finishing a floor of yellow pine without waxing it? I would say, by way of explanation, that the floor is not subject to hard usage.

Plan of Ice House Wanted.

From O. R., *Monmouth, Ill.*—I should like to ask the readers who have had practical experience in building ice houses if they will kindly furnish for publication a plan of such a building suitable for a farm, and also tell how it should be constructed?

CENTERS FOR ARCHES OF DOUBLE CURVATURE.*—IX.

By Charles H. Fox.

In "squaring up" the plank select a piece of wood sufficiently large to contain the figure included in the diagram, Fig. 28. The better plan is to cut a paper pattern similar to the shape shown in the diagram and then transfer the curves of Fig. 30 to the pattern, taking care that they keep the same position in the pattern that they do in the diagram; that is the point D of the curve must be placed to that of D of the line D-D′ in Fig. 28. Now having dressed up the face of the plank, mark on the pattern at the face of the plank, and cut the plank square through to the thickness given in 18-19 of Fig. 28. Dress up the top and under surfaces, making them straight and square.

We are now ready to apply the side bevels, their application being shown in Fig. 35. Having transferred the angle of the bevels to the top surface of the plank as shown by T A I and C D′ E′ of the diagram, apply the plumb bevel at the points given in A and I as shown. Mark with great accuracy the plumb lines corresponding to those shown by A″ W of Fig. 28 and I Y of Fig. 35. Observe that the length of A″ D′ of the plank is equal to that of A″ D′ of Fig. 28. If correct repeat the operation by drawing the plumb lines E E′ and D D′ at the lower end of the plank. Again observe that the length either of the line D D′ or of E E′ is equal to that of the corresponding line of the diagram in Fig. 28. If correct work off the lower joint surface represented by D E G in Fig. 35, making this surface square with the line D D′ and to the face of the plank. Now take the bevel E Y W and to its direction at the joint surface just formed mark the line represented in D E of Fig. 35. At the center joint take the side bevel T A I of Fig. 35 and mark this at the lower surface through the point represented by W in Fig. 28. This gives the direction for forming the joint over the center line I A. Work the surface true and straight.

It may be necessary to remind young students who attempt to model this sash to observe great accuracy in applying and working to the bevels; and to be careful to get the prisms, or, in other words, the two planks, each containing a half rib of the top rail to which we assume the bevels have been applied and cut; having at the same time all the bevels fitting and the surfaces worked true. This should be scrupulously attended to before any molds are applied and worked, for to ease a joint after the rail is worked is rather troublesome, and may be obviated by working accurately. Now transfer the falling mold of Fig. 30 to the outside face of plank; that is, to the face over A D of the plan. In this operation it will be observed that the length, 6 W at the plank, is made equal to that given at the corresponding projection of Fig. 25. Also that the point D of the pattern be placed exactly to the point represented in D of Fig. 28.

At the points given in 6′ 7′, at the center joint surface, square through lines as shown in Fig. 31. This gives in the points 7, 6, E, F, as shown in Fig. 35, the direction in which to apply the falling mold at the inside face over I E of the plan. Having transferred the contour of the mold to the faces correctly, cut through the plank in the direction given by the curves. When dressing up these surfaces take care that the surfaces are made to coincide with the lines as given at the face of plane. Having accurately formed the surfaces gauge the piece to the width, as given in B H of Fig. 24.

It is a superfluous operation to work off the whole of the back surface, which belongs either to the plank or to the solid, such as we have now formed. For this reason there are only two points of the whole surface which are retained or comprised at the finished solid of the rail. These are the points given in E, at the bottom joint surface, and that contained in the element over I of the plan, and represented in 6 7 of Fig. 35. The same remark applies to the surface over D E of the plank; while at the models this surface has been shown in its entirety, yet this was done in order to prove the correctness of the bevels. If the surface represented in the end of the model had been formed in the working of the plank the only portion which would have been retained is that immediately connected with the line D E, as given by the bevel E Y W, so that, having formed the lower joint surface in the manner explained, the application of the bevel gave the direction in which to apply the face mold in the point E. If the plank has not been worked off to the width B H, that distance may be marked around the surfaces of the soffit and exterior bounding element lastly formed, and also at the center joint surface. Now the falling mold of Fig. 34, of the exterior bounding surface, may be applied. The points given in E, at the bottom joint, and in 7 at the center joint surface, give the points at which to apply the pattern. Now cut a pattern to the contour of the solid of the vertical stile, as given in P R E p, of the plank, and apply this as shown in the corresponding figure of Fig. 36.

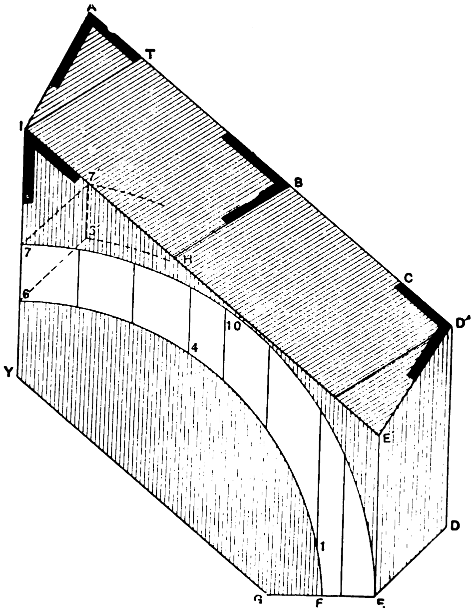


Fig. 35—Diagram Showing Manner of "Squaring Up" the Plank; Also Application of Bevels and Falling Molds.

Centers for Arches of Double Curvature.—IX.

We have now obtained in the points given in P I the direction at which to apply the soffit pattern of Fig. 32. Its application is shown in Fig. 36. Mark on the patterns, and to their direction form the solid of the rail. In working the surfaces of the two faces always hold the plane and straight edge in a vertical direction, for, as we have explained in chapters preceding, the elements of the cylindrical surface are perpendicular over the plan. This vertical direction may readily be obtained if, when the falling molds are applied to their respective surfaces, the points, as given in K K, L L, &c., of the two patterns, be transferred to the surfaces (for the points given at the patterns belong to the same vertical plane—that is, the points, as those of K K, at the patterns belong respectively to the points 5 8 of the one vertical element of the surface of the cylinder), the direction in which to apply the straight edge may be obtained.

In Fig. 37 is shown a projection of the solid which we have now obtained. Now mark at the joint surfaces the contour, as required at the finished rail, and scribe the working lines around the faces, and in the manner which suggests itself work out the molding and so finish the solid of the rail. Of course, in the workshop where a band saw is at command, by "horsing" the plank at its

---

* Copyright, 1906, by Charles H. Fox.

completion of building construction or that tends to deprive those who wish to work of an opportunity to provide for those dependent upon them."

The league also expressed the opinion "that unwarranted delays and interferences in the progress of building and construction and public improvement of whatever kind and description are against public policy and public progress, and are in opposition to the best interests of those dependent upon the employers and the workmen."

A majority of the members of the Pittsburgh Architectural Club celebrated its first meeting of the season by a banquet at the German Club. After the menu had been properly considered business matters were discussed and committees appointed to carry out the plans for this fall and winter. A dinner is to be given by the club once a month at some one of the leading hotels with the evening devoted to general club affairs. Arrangements are to be made for a series of lectures by architects from outside the city. The membership is limited to draftsmen employed by local architectural firms or young architects, and it is planned to make this season a banner period in the club's history. Architect Thomas J. Herron is chairman of the Entertainment Committee. The officers recently elected for the ensuing year are: President, E. B. Lee; vice-president, Richard Kirhnel; secretary, S. L. Roush, and treasurer, James McQueen.

Rochester, N. Y.

The report of the Bureau of Building Inspection covering the month of August shows an appreciable falling off in the value of the building improvements for which permits were issued as compared with the same month a year ago, the figures being, respectively, $480,659 and $607,147. Present operations, however, are decidedly in excess of August, 1904, when the value of the building improvements was only $247,728.

For the first eight months of the year the value of the improvements aggregates $4,227,084, as against $3,661,279 for the corresponding period of last year and $3,014,754 for the first eight months of 1904.

Santa Rosa, Cal.

Since the disastrous "quake" and fire of April 18 and 19, which absolutely wiped out the business section of the city, Santa Rosa has been rallying nobly from the blow and at the time of this writing (August 31) fully three-fourths of a million dollars' worth of building is either under contract or permits for it have been issued. It is expected that within a year or 18 months at the outside such progress will have been made as to leave few, if any, traces of the disaster, and in the end it is believed Santa Rosa will be the gainer through a better constructed and a greater city.

Incidentally it may be remarked the "quake" has strengthened the local Builders' Exchange, and there is at present a membership of over 40, with a bright outlook for the future. The rooms of the Exchange, together with its books, papers, by-laws, &c., were all destroyed by the fire, but President Henry Hoyt states that the organization is again on its feet and doing business.

Since the earthquake Santa Rosa has adopted a new building ordinance and created the office of building inspector, the result of which action will be to do away with flimsy structures and poor buildings.

San Francisco, Cal.

Throughout the month of August building activity in San Francisco continued to increase, and building permits were issued to the amount of $4,200,000, as compared with $3,500,000 for the month of July. This total included a large amount of wooden construction, but the most notable feature of the month was the undertaking of large permanent fireproof construction work. The total included eight permits for reinforced concrete buildings, aggregating over $300,000 in value, and ninety permits for brick buildings, aggregating $1,658,000 in value, beside a number of large buildings to be built either of brick, stone or reinforced concrete. The construction of galvanized and corrugated iron buildings was not very noticeable during the month, there having been very few permits issued for this class of work.

The labor situation, as far as the building trades are concerned, has been fairly satisfactory. There have been no strikes or lockouts of consequence in the city, and the number of workmen employed has been steadily increasing. Wages are generally higher, and both contractors and labor unions are showing a tendency to lower the standard of skill required in the various trades. The State Labor Commissioner has just submitted a report comparing the building situation here on June 10 and on August 20. His figures show that a smaller number of contractors were operating on August 20, though a much larger number of mechanics than on June 10. Out of 705 carpenters interviewed on June 10, 12 were receiving $3.50 per day; 621, $4; 6, $4.25; 34, $4.50; 28, $5, and 3 over $5. Out of 868 carpenters interviewed on August 20, 6 were receiving $3.50; 329, $4; 52, $4.25; 325, $4.50; 116, $5, and 40 over $5. Out of 162 bricklayers interviewed on August 20, nearly all were receiving $7 per day, though a few individuals were receiving from $1 to $3 more.

The commission appointed by Governor Pardee of California has filed its preliminary report on the effect of the recent earthquake in that State. The portion which deals with the building situation says: "Modern class A steel structures with deep foundations appear to have been relatively passive, while the made ground in their immediate vicinity was profoundly disturbed. Thoroughly bonded and well cemented brick structures on similarly deep and solid foundations seem to have been equally competent to withstand the shock, except for occasional pierlike walls, not well tied to the rest of the building. The weak points in wooden frame structures were in general faulty underpinning, lack of bracing and chimneys entirely unadapted to resist the shocks. With these faults corrected, frame buildings of honest construction will suffer little damage beyond cracking of plaster in such a shock as that of April 18, save on the made ground, where deep foundations and large mass appear to be essential for the necessary degree of passivity."

During the past month contracts have been let for the repairing of a number of the larger buildings damaged during the April fire. Contracts for repair work on nine of these buildings aggregate $1,674,637. The largest of these contracts was for the Merchants' Exchange Building, on which the reconstruction work will amount to $700,000. This will include the replacing of a large amount of the brick walls on the three sides most exposed to surrounding fires. The repairs on the Crocker Building, at the corner of Post and Market streets, will be made at a cost of $400,000. The other contracts referred to are as follows: The Shreve Building, on the northwest corner of Grant avenue and Post street, $200,000; the Mutual Savings Bank Building, Market and Geary streets, $125,000; Wells, Fargo & Co.'s Building, corner of Mission and Second streets, $100,000; the Flood Building, corner of Market and Powell streets, $90,000; the Union Ferry Depot, at the foot of Market street, $43,400; the United States Mint, on Fifth street near Mission, $5190, and the United States Appraisers Building, at the corner of Washington and Sansome streets, $1050.

The Board of Experts appointed by the San Francisco Board of Supervisors to examine the City Hall, Hall of Records and Hall of Justice, and to give an estimate on the cost of restoring these buildings, submitted its report on September 4. As regards the City Hall, the board finds that the foundation walls and basement walls have not been seriously damaged and that the basement is structurally intact, being injured only to the extent of the destruction of the finishing work by fire. The northeast wing could be repaired at an estimated cost of $600,000. The southwest end of the Larkin street wing is practically ruined, as is also the Larkin street front. Above the basement the City Hall Avenue front is destroyed. The structure supporting the main dome is stated to be in a "fair" condition as far as the second gallery level, above which the masonry must be taken down. From this point the steel framework supporting the main dome is vertically out of plumb and horizontally out of level. The board reports, however, that the main dome can be saved by proper reinforcement to the supporting members. The upper dome is intact. Three of the main staircases are in good condition. Most of the corridor floors and walls throughout the building are structurally good, but the roofs, including the towers, are entirely destroyed. The board estimates the cost of repairing the entire building at $2,408,000.

The board finds the Hall of Records structurally sound, with the exception of the brick inclosing walls of the third story and a small portion of the second story. The board estimates the cost of repairing this building along modern fireproof lines at $110,000.

The report of the board on the Hall of Justice is very brief, merely stating that the salvage on this building would be about one-third its value if the building is rebuilt on the old plan.

St. Paul, Minn.

We are informed by A. V. Williams, secretary of the Builders' Exchange, that arrangements were completed a short time ago to take possession of the former quarters of the organization on September 15. The building, damaged by fire, has been remodeled, and the Exchange has two additional rooms, which give the members increased facilities and puts the organization in better shape than ever before for transacting its business.

The outlook for fall work is good, and indications are favorable for continued prosperity in the building line. The great bulk of the work the past season has been in the shape of warehouses, business blocks, factories, public buildings, schools, theaters, etc., with comparatively few moderate priced dwellings and flats, although many high grade residences have been erected. The $400,000 auditorium, the cost of which was paid with funds raised by popular subscription, is about completed, and the new Young Men's Christian Association Building, to cost $350,000, which money was also raised in the same way, has just been commenced.

Washington, D. C.

The annual report of Building Inspector Ashford, submitted to the Commissioners of the District of Columbia on August 18, showed that in the fiscal year ending June 30, 1906, there were $11,789,201 expended in building improvements exclusive of Government work, whereas in the previ-

ous fiscal year the outlay was $12,459,850. Even including Government contracts, the outlay for the fiscal year covered by the report was less than the preceding 12 months, owing to the fact that the six permits issued by the Building Department for District Government buildings involved an outlay of only $312,675. There were in all issued by Inspector Ashford 9434 building permits.

Since 1897 the cost of public buildings, the inspector declares, has increased from 7 cents per cu. ft. to 13 cents, and he accounts for the fact by the great advance in the cost of materials and labor.

A detailed report is embodied showing that the Business High School cost 8.3 cents per cu. ft.; the John Ross School, 11.4 cents; the Henry T. Blow School, 12.2 cents; No. 18 engine house, 18.3 cents, and the fire boat house, 10.3 cents.

At the close of the fiscal year the inspector estimates the number of buildings in the District as 49,285 brick structures and 21,691 frame buildings, as against 47,954 brick and 21,248 frame buildings at the close of the previous fiscal year.

Notes.

The scarcity of skilled mechanics in the building trades is a complaint which comes from contractors in many sections of the country, the latest point heard from being Wilkes-Barre, Pa. The statement is made that the scarcity of carpenters and bricklayers has delayed the construction of many buildings in that city and some contractors are months behind, with no hope of catching up until winter weather. In regard to the scarcity of labor, John J. Casey reports the demand for union carpenters at the present time as surpassing all expectations. There is not a contractor who could not increase his force by a large percentage.

The Building Trades Employers' Association of Hudson County has established a permanent headquarters, to be known as the Builders' Exchange, at 53 Montgomery street, Jersey City, N. J. The headquarters will be fitted up with a view to meeting the requirements of the association and will, we understand, be used as a permanent employment bureau.

At a recent meeting of the Independent Builders of Toronto, Can., a new organization was formed, to be known as the Master Carpenters' and Builders' Association, with the following officers: President, J. T. V. May; vice-president, Thomas Jones; secretary, Arthur Laxton.

LAW IN THE BUILDING TRADES.

By W. J. Stanton.

THE Appellate Court of Indiana has decided that a materialman may sue directly on a contractor's bond running to the owner and conditioned to pay for all material used in the construction of the building, although he has a right to enforce a lien on the building for the material furnished by him.

DESCRIPTION OF LABOR AND MATERIALS.

A notice of lien described the labor and materials used in the work as follows: "The labor performed or to be performed is plumbing and gas fitting, and the materials furnished or to be furnished and the agreed price or value thereof is iron, lead and brass pipe and fittings and castings, baths, sinks, basins, tubs, closets and other sanitary materials at the contract price of $7300," is held by the New York Court of Appeals in Gilmour vs. Colcard to be a sufficient description of the nature of the work and the character of the materials.

WHEN LIEN CANNOT BE FILED FOR MATERIALS.

Where sureties on the bonds of a building contractor agreed not only that the contractor should perform the contract and save the owner harmless from any liability, but also that the bond should secure the owner from any and all mechanics' liens that might be placed on the property, the sureties are estopped from filing a lien for materials furnished the contractor. This is the substance of the holding in the case of Miller vs. Taggart, Appellate Court of Indiana.

WHAT IS A "MANUFACTORY" WITHIN THE MEANING OF THE LAW.

Under the lien law of Indiana, giving contractors and laborers a lien for material furnished and labor performed in the erection of any house, mill, manufactory, &c., the Supreme Court of Indiana has decided that a building equipped with machinery for the generation of steam to be distributed under a municipal franchise through pipes in the streets is a manufactory within the meaning of the law.

The question arose through a lien filed by a laborer employed to haul away dirt dug out of, and to haul sand to be used in refilling a trench dug in a street for a steam pipe connecting a plant for generating steam to be distributed for heating purposes. The Court holds that the contract for the excavation of the trench, the laying of the pipe therein, and the restoration of the street to its original condition, called for the performance of labor in and upon the erection of the manufactory, and were incidental matters inseparably connected with the principal undertaking for which the laborer was entitled to a lien.

WHEN NOT RESPONSIBLE FOR LOSS OF LUMBER BY FIRE.

In a Massachusetts case a contractor entered into a contract with a city for the repair of a wooden bridge forming part of a highway. The contract provided that the timber and other wood work of the carriage way should be replaced by sound material, the contractor to be paid a certain sum per 1000 feet for new material wrought into the bridge, and that no work should be begun until material for at least one-half of the repairs contemplated should be upon the job. Complying with this condition, the contractor distributed lumber all along the bridge and upon the river banks. While the work was proceeding the bridge and the lumber upon it were destroyed by fire. The Court held that the city was not liable for the loss of the lumber upon the bridge not yet wrought into the bridge, but its liability was confined to paying for such portion of the work and materials as had become identified with the bridge at the time of its destruction. The Court says, "In whatever way the principle may be stated, it would seem that the liability of the owner in a case like this should be measured by the amount of the contract work done which, at the time of the destruction of the structure, had become so far identified with it as but for the destruction it would have enured to him as contemplated by the contract."

ARCHITECTS' CERTIFICATES AND ENGINEERS' ESTIMATES.

An agreement in a building contract that there shall be no liability to pay for the work done, except upon an architect's certificate, is valid. When such a provision is inserted in the contract the certificate must be substantially such as the contract calls for or it will not authorize a recovery.

When a provision is made in a building contract for the payment of the price, or a portion of the price, upon the certificate of the architect in charge of the construction of the building, the obtaining or the presentation of such certificate is a condition precedent to the right to require payment, and such condition must be strictly complied with, or a good and sufficient excuse shown. No action can be maintained upon the contract in the absence of such certificate, unless it has been demanded from the architect and fraudulently, arbitrarily or capriciously withheld by a clear mistake.

If after the work has been substantially completed the architect refuses to give a certificate, and such refusal is based on unreasonable requirements, the failure to obtain the certificate does not bar a recovery by the contractor, although its procurement is by the contract made a condition precedent to recovery. If the certificate required is arbitrarily and dishonestly withheld, the builder may recover on showing that fact and that he has performed the contract according to its terms. If, without fault of the contractor, the architect refuses his certificate, he cannot thereby prevent a recovery by the contractor for damages suffered by him from a breach of the contract by the employer. Where the contract provides that payments shall be made only upon certificate of the architect that the work has been done in a good and workmanlike manner, the fact that payments have been made from time to time without requiring strict performance of such condition is not a waiver thereof. Any act of the owner which prevents the contractor from procuring such certificate relieves the contractor from the duty of procuring one. If there remains any material part of the work which can reasonably be done in accordance with the contract, the architect may rightfully withhold his certificate until the contractor has completed such work, and so long as he can rightfully withhold his certificate there can be no recovery.

A provision in a construction contract that the engineer or architect of the owner shall finally determine, as between the contractor and the owner, what work has been done and the amount to be paid for it, is valid and will be enforced in the absence of fraud or palpable

mistake. If the parties to a building contract agree that the architect shall pass upon the work and certify upon the payments to be made, his decision, as shown by such certificate, is binding and conclusive upon them, and can be attacked only for fraud or evident mistake.

Engineers' estimates and certificates are governed by the same rules as control architects' certificates, and an agreement in a construction contract providing that estimates of the quantity or quality of the work done thereunder shall be referred to an engineer, whose determination of such question shall be conclusive upon the parties is valid, and when an award has been made thereunder in good faith it is binding upon the parties. A provision in a construction contract that when the work is completed there shall be a final estimate made by the engineer of the quantity, quality and value of the work, and the balance, after deducting monthly payments and on the contractor's giving a release, shall be paid in full, is not an agreement that the engineer's estimate shall be conclusive. But even when such estimates are made conclusive by stipulation, the courts will relieve against mistakes in measurements and calculations appearing upon the face of the estimates, or clearly proven, or from a neglect to measure or estimate any particular part of the work, or from wrong constructions put upon the provisions of the contract by the engineer, but the courts will not relieve against slight discrepancies in measurement.

Although the contract stipulates that in all questions connected with certain estimates required, and the amounts payable under the contract, the decision of the engineer of one of the parties shall be final and conclusive; yet if the conduct of such engineer is fraudulent or he is guilty of a mistake so gross as to amount to fraud on the rights of the opposite party the latter is not bound by his estimates and may maintain his action on the contract to recover the true amount due him.

MASTER OBLIGED TO FURNISH THE MEN A SAFE PLACE TO WORK.

In the case of McElwaine-Richards Company vs. Wall, Supreme Court of Indiana, a workman was employed to do general work in and about the construction of an addition to a building. A portion of an old building on the site was being torn down, and the workman was injured by the falling of a truss which was in process of construction. Just prior to the time of the accident the superintendent directed two workmen, one of whom was injured, to take down some joists, but did not give any particular directions in the manner in which the work was to be performed, or what part of the work should be performed by each. The truss was not fastened in place owing to the fact that work had not progressed that far, and the truss fell while one of the workmen was standing on it lowering the joists. The case is interesting principally as involving the construction of the rule that the master is obliged to furnish the servant a safe place to work. The Court says:

"The work of constructing an addition to appellant's foundry was clearly of such a character as to make it inevitable that as it progressed the environment of the servants engaged therein must undergo frequent changes, and it was not the duty of the master to be continuously present to warn and protect such servants against the dangers resulting from those changes. It is well settled that the rule requiring the master to furnish his servant a safe place to work does not apply when the work of such servant consists in making safe the place and conditions of which complaint is made." It was found by the jury that there was nothing about the construction of the truss that a man of ordinary intelligence could not understand, and that the workman could have readily discovered that the truss was liable to fall, if subjected to any considerable lateral strain, if he had looked at it. The Court holds that the workman "was chargeable with knowledge of those things which by the use of his senses he could readily have learned. He is shown to be a man of mature years, of ordinary intelligence and in full possession of all his faculties. A servant thus endowed must exercise his natural sense for his own safety, and, failing so to do, must suffer the consequences." The Court holds that the workman was not in the exercise of due care at the time of receiving the injury, and could not recover.

◆

According to the Trade School catalogue just issued by the Massachusetts Charitable Mechanic Association, Boston, Mass., three new trades will be taught this season in addition to those of last year, namely, electricity, tile laying and house painting. The carpentry class last year was more succecssful than ever before, and the indications are for an equally fine showing the ensuing school year. The new department of boat building was received with a great deal of interest, and in addition to building sections of boats, one of which is illustrated in the catalogue, a 23-ft. motor boat was commenced and partially finished, the plans having been drawn by one of the members of the class. During the coming term the boat is to be completed ready for launching. In addition to boat building the regular work in house carpentry, joinery and cabinet making was carried on. The trade school of the association is under the direction of John W. Wood, Jr.

Wisconsin's New State Capitol.

The Wisconsin State Capitol Commission recently met at Madison, Wis., and after considering plans presented by architects from various parts of the country, voted unanimously to recommend the selection of the plans submitted by George B. Post & Sons, New York City. The plans had been recommended by E. H. Burnham of Chicago, who was called in as an expert to pass upon the various designs submitted. The new building when completed will represent an expenditure of about $5,000,000. The commission has available for immediate uses, appropriated by the last Legislature, the sum of $660,000, and as the construction progresses the plan is for the Legislature to provide further funds and otherwise direct the commission in the continuance of the work. The general plan of the building is a St. Andrew's cross, the extensions running out from the four avenues approaching the capitol park. This will swing the present location of the capitol around so that its extensions will not be in line with the cardinal points. There will be a large terrace around the building. The main entrances will be at angles, which will be opposite the main streets of Madison. The building will be four stories high above the basement, and it is probable that the foundation will be of red or white Wisconsin granite, and the superstructure of a corresponding granite or stone of some other quality. The dome of the new building will be much as it is at present, except that it will be much higher and larger and more ornate. Some minor changes are to be made in the plans as submitted, but the preliminary work of letting contracts and commissions active construction will be commenced at once.

L. F. Porter, of Madison, was elected secretary of the Capitol Commission, and will be actively in charge of the work under the direction of George B. Post & Sons.

A City of Sheet Metals.

One of the strangest cities in the world as far as the buildings are concerned is Beira, a little town in Africa, which is built almost entirely of sheet metals. The governor's residence, the public buildings, the soldiers' quarters, shops, hotels and private residences are all built of galvanizd iron or zinc sheets. Many tons of galvanized sheets have been sent from Great Britain, France and America, which have been used to build up this town in a period of less than six months. Through a fever of speculation hasty lodgings became imperative, and as there was no wood or stone available the only material that could be imported quickest and cheapest was used. It is said that even the wagons are made largely of sheet metals. Some fanciful artist has said that should an inhabitant fall ill or meet with an accident he is carried away to the hospital on a sheet of metal torn from the building nearest the scene of the catastrophe. Should he die he is carried to his grave in a coffin of sheet metal. The food of the population, as far as meats are concerned, consists of canned meats, and when there is a scarcity of other sheet metals the cans are torn apart and used for roofing or other purposes, the tin then being laid on as in shingles. Two houses have been built of stone imported from France at a cost of nearly $30,000 each, and the owner and occupants are the objects of envy to the other inhabitants. In other South African cities old petroleum or kerosene cans of 2, 4 and 6 gal. capacity are used when empty to form the sides of buildings or roofs. Many times they are left in cylindrical shape and used for flour boxes, pails or drinking troughs for cattle.

Building a Concrete Cistern.

One of the important adjuncts of the average farmhouse, as well as of many suburban homes where city water is not readily available, is a well constructed cistern for storing rain water, which for many purposes is greatly preferred over well or city water. While different forms of construction are employed one of the most durable at the present time is built of concrete, Fig. 1, and in this connection it may not be without interest to give such particulars as will enable the reader to construct one should circumstances demand. The first work is to make a circular excavation 16 in. wider than the desired diameter of the cistern, or allow for a wall two-thirds the thickness of a brick wall that would be used for the same purpose, and from 14 to 16 ft. deep. Construct a cylindrical inner form, the outside diameter of which shall be the diameter of the cistern. The form should be about 9 ft. long for a 14-ft. hole and 11 ft. long for one 16 ft. deep. Saw the form lengthwise into equal parts for convenience in handling. Lower the sections into the cistern and there unite them to form a circle as indicated in Fig. 2, blocking up at intervals 6 in. above the bottom of the excavation. Withdraw the blocking after filling in the spaces between with concrete and then fill the holes left by the blocking with rich mortar.

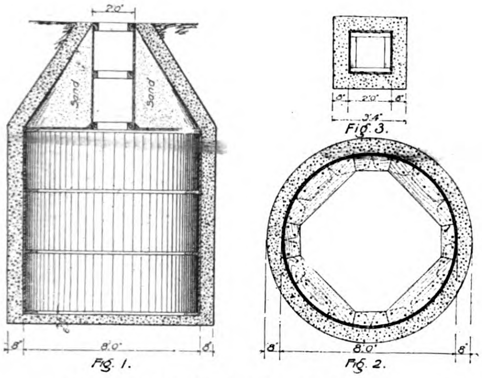


Fig. 1.—Vertical Section through Cistern.
Fig. 2.—Horizontal Cross Section.
Fig. 3.—Plan of Opening in Top of Cistern.

Building a Concrete Cistern.

Make the mortar of 1 part Portland cement, 2 parts clean, coarse sand and 4 parts broken stone or gravel, mixing just soft enough to pour. Fill in the spaces between the form and the earth with concrete and puddle it to prevent the formation of stone pockets, using a long scantling for the purpose, and also a long handled paddle for working between the concrete and the form.

In order to construct the dome without using an expensive form proceed as follows: Across the top of the form build a floor, leaving a hole in the center 2 ft. square, as shown in Fig. 1 of the illustrations. Brace this floor well with wooden posts resting on the bottom of the cistern. Around the edges of the hole and resting on the floor described construct a vertical form, extending up to the level of the ground; build a cone-shaped mold of very fine, wet sand from the outer edge of the flooring to the top of the form around the square hole and smooth with the wooden float. Place a layer of concrete 4 in. thick over the sand, so that the edge will rest on the side wall, as indicated in Fig. 3. Allow the concrete to set for a week and then remove one of the floor boards, allowing the sand to fall gradually to the bottom of the cistern. When all the boards and forms are removed they can be easily passed through the 2-ft. opening and the sand taken out of the cistern by means of a pail lowered with a rope. This does away with all expensive forms and, says *Concrete Construction*, issued by the Atlas Portland Cement Company, is perfectly feasible. The bottom of the cistern should be built at the same time as the side walls and should be of the same mixture, 6 in. thick.

A square cistern is much easier to build and in most cases answers the purpose equally as well as a round one. It is only necessary to excavate to the desired depth and put in a 6-in. concrete floor, composed of 1 part Portland cement, 2 parts sand and 4 parts broken stone. As soon as practicable put up forms for 8-in. walls and build four walls simultaneously. If more than 8 ft. square the walls should be reinforced with a woven wire fabric.

◆

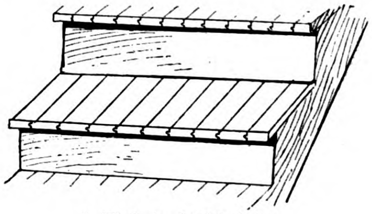
Weather-Resisting Qualities of Roofing Tiles.

At the annual convention of the Roofing Tile Manufacturers of Germany a paper was read in connection with the proposition which was brought up last year to get standard tests in regard to the quality of roofing tiles. The author referred especially to tiles made from shale, which are not burnt to a close dense body, and which show good weather resisting qualities. He showed that tile with 10 per cent. absorption when laid on a roof did prove excellent, while when tested with the new regulation it would barely pass examination. That the resisting qualities of a roofing tile depend upon its quality to absorb water is a wrong idea. Old hand-made tile which were made in 1720 and which were taken from a roof in 1905 did not show any signs of weathering. These tile had been on the roof over 185 years, and are considered soft burned tiles. In comparison to tile made to-day from the same shale as these were formerly made of, and which were burned by cone 011-010, these old tile were certainly not burned any harder than cone 014. It is also certain that this tile had absorbed in these years enough water to bring out its weathering qualities, and as the tile which were recently made from the same shale do not show to compare favorably with the standard tests it is conclusive that these tests are not satisfactory. In the opinion of the author, a Mr. Schmullius, the most satisfactory tests were the ones which were conducted with freezing tests, and he warned all the tile manufacturers not to put any material on the market which could not stand these freezing tests.

◆

A Kink in Stair Building.

Maple and oak are the recognized standard materials for stair treads, and up to this time, says the *Hardwood Record*, stair treads have been made of one piece of lumber laid the long way of the stair, with the result that where the travel is heavy the wearing coming across the grain the wood wears out very soon. Builders of stairs in factories, mills, stores, elevated railroad stations, &c., will find that short ends of either seven-eighths maple or oak flooring made into a tread, so that the wear will come endwise of the grain, as shown in the illustration, will last longer and prove generally more serviceable than double the thickness of step plank laid in the usual way. Besides there is a matter of economy involved in the practice, as short flooring can be had at a low price.



A Kink in Stairbuilding.

◆

THE MASTER ROOFERS of the Pittsburgh District have formed an association to be known as the Master Slate and Roofers' Association of Allegheny County. The specific objects for which it asks incorporation are union for beneficial and protective purposes and the avoiding and adjusting of trade controversies between its members and their employers.

THE CALIFORNIA REDWOOD IN THE WORLD'S WORK.

By H. A. Crafts.

THE noble California redwood as a simple tree has been pretty well exploited in the general literature of the day; its gigantic proportions have been, and still are, a valuable asset in the sum total of the State's wonders.

The redwood logging camp has also been liberally dealt with by the current writer; it has also been photographed time and again. But in its every-day uses, in commerce, manufactures, arts, engineering and mechanics the redwood has not received so much attention.

The California redwood has long been the leading article of lumber used upon the Coast; and its use, instead of diminishing with time, is increasing.

Look at the great majority of California dwellings; examine their composition and you will find that the redwood composes the bulk of the lumber entering into their construction. Joists of floor, walls, ceiling or roof will be found to be composed almost exclusively of redwood, while the same substance may be found in siding, sheeting, interior and exterior finish, and even the roof will be found to have been covered with redwood shingles.

By the way, speaking of shingles, time and experience have taught the builder that it is the redwood shingle that has excelled even the cedar shingle of the North in durability. In 1860 a certain house in Boston was shingled with redwood. That same house is standing today and the original shingles still cover it and are said to be nearly as good as ever; and the Boston climate is a pretty rough one on shingles, too.

Durability of Redwood Shingles.

Then here in California there are thousands of houses that were shingled with redwood 30, 40 and 50 years ago, and those same shingles are almost as sound to-day as they were when they were put on.

Now there are very good reasons for this quality of durability. To begin with, if you will examine a piece of average redwood lumber you will find that it is very light in weight, and if you will examine it more closely with the eye you will find that that it is almost absolutely free from knots, pitch or pitch seams; in fact, the redwood is composed almost wholly of what the lumberman calls "clear stuff."

To sum up, the redwood is not "sappy"; it is free from pitch, it is straight of grain and free from blemish; it therefore makes an ideal building material.

Again, there is probably not a wood in the world that may be adapted to so many uses as the California redwood. Observe the Mission furniture and unique cabinet work that are now made of this material.

Redwood as an interior finish is now very popular in all the Coast regions, and is finding its way into the East. Chicago is at present offering an excellent market for the redwood.

Redwood for Interior Finish.

A recent national assemblage in San Francisco was attended by a wealthy Chicagoan who was having built a very elegant and costly home in the "Windy City." Just before starting for the Coast he had given orders for the lumber for the interior finish, and expected to see a part of the work done upon his return from California. But he came to California and saw some of the elegant redwood finish that may be seen here. He was at once struck with its richness of color and of grain. The more he saw of it the more he liked it; in fact he was completely captivated with it. Then he hurried to the nearest telegraph office and sent a wire to Chicago countermanding the order for the lumber for the interior finish of his new mansion given before leaving for the Coast. That task performed, he went to a San Francisco lumber firm and ordered a big bill of redwood to be despatched for the East post haste, to take the place of the rejected lot of Eastern lumber.

To show that redwood lumber is in demand it is only necessary to call attention to the fact that the "clear stuff" in the San Francisco market commands from $35 to $40 per 1000 ft.

California redwood is extensively used in the manufacture of doors, windows, sash, blinds, &c. It makes very handsome panels, especially if the lumber is selected with reference to the beauty of its grain. Panels of this kind, well polished, oiled or varnished, are very ornamental indeed. The wood also makes very handsome newel posts and rails.

It is in the great engineering enterprises of the Pacific slope that the California redwood again takes a prominent place. It has been found the very best wood in the world for use in the manufacture of stave pipe for the conduct of water mining, irrigation and domestic purposes.

In works of this kind it may be found all the way from Los Angeles to Butte, Montana. To particularize more fully it is used for city water works, water power plants, hydraulic mining; in irrigation works it frequently takes the place of flumes in conducting water across difficult places by means of upright or inverted siphons.

For use in the construction of domestic water works systems the California redwood stave pipe is also finding its way into the East. One San Francisco firm is just completing a contract for a 20-mile system of domestic service pipe in Lynchburg, Va. The pipe used is 30 in. in interior diameter.

This firm secured the contract in competition with both metal and wood pipemen of the East and West; it being shown to the people that the redwood pipe was superior to all others.

For water pipes the California redwood has been found more durable than all others ever used in work of the kind. This is by reason of the qualities already cited. There appears to be no other wood in the world equal to it in its power to resist decay.

Redwood Water Pipes.

California redwood stave pipe is made in all sizes, ranging from 8 in. to 10 ft. in internal diameter. Nine feet internal diameter was the largest used until the present year. This year one San Francisco firm is manufacturing 10-ft. pipe. These large-sized pipes are used principally for penstocks in water power plants.

Wood stave pipe has been found far better adapted for mountain construction than iron or steel pipe. This is by reason of its lightness; and California redwood being lighter than any other wood used in the manufacture of water pipe it therefore stands to reason that it is the wood par excellence for this purpose.

Seasoned redwood only weighs 2½ lbs. to the board foot, so that it may be seen that it is both easy to handle and to transport. This makes it just the thing to use in the great mountain mining districts of the Pacific slope.

Iron or steel pipe, besides being inherently heavy, must needs be transported from factory to place of use in its manufactured form; but while wood pipe is inherently lighter it may be transported in its "knocked-down" condition, or in other words piece by piece. Thus the separate staves of the pipe may be lashed to the backs of burros and transported into the most rugged mountain districts where no wheeled vehicle could be drawn nor any metal pipe of considerable size could be carried.

Staves for the making of wood pipe are run out upon quite an ordinary machine known as the "sticker." The edges of the staves are cut on radial lines, and the sides on concentric circles that conform with the radii of the pipe under construction.

The wood pipe has another superior quality that makes it desirable for mountain construction—it may be turned from a straight course in curves instead of upon angles, as iron or steel pipe must be. Of course the curve must be regulated largely by the size of the pipe used. For instance a 10-in. pipe may be curved on a 125-ft.

radius, but a 9-ft. pipe cannot be curved upon a shorter radius than 800 ft.

Again, redwood is found to be extremely useful in the construction of tanks of all sizes for the holding of water, oil, wine, &c. In the mining districts no cyanide plant is seen without its array of great redwood tanks. A water tank at the big lumber yards at Black Diamond, Cal., is 31 ft. and 9 in. in diameter and 18 ft. high. It will hold 100,000 gallons.

All things being equal a California redwood railroad tie will outlast a tie made of any other known wood. The average life of a redwood railroad tie is about 12 years and then they only wear out—they do not decay. It is only the constant jar imparted to them by passing trains and the attrition of the metal rails that appear to fease them.

California lumbermen say that the demand for redwood is constantly on the increase, yet the supply is limited. The principal redwood forests extend along the coast from the northern boundary of the State nearly to the Golden Gate. They extend back from the coast only about 10 or 12 miles. There are some smaller forests south of San Francisco, but they do not count much when it comes to a lumber supply.

Humboldt County has the largest bodies of redwood. It originally contained 530,000 acres of forest; of this amount 52,000 acres have been cut, leaving the present area something like 486,000 acres. It is estimated that upon this acreage stand not less than 49,000,000,000 ft. of lumber. The present rate of redwood consumption is about 250,000,000 ft. annually. At that rate the Humboldt County supply would last about two centuries.

But experts figure a greatly increased demand for redwood and predict that the supply will be about exhausted a century hence.

New Publications.

Hendricks' Commercial Register of the United States for Buyers and Sellers.—1276 pages; size, 8 x 10½ in.; bound in heavy board covers, with side and back titles. Published by the Samuel E. Hendricks Company. Price, $10, express charges prepaid.

This is the fifteenth edition of a work of reference which has established a wide reputation and is the most complete edition that the publishers have ever issued. The work is especially devoted to the interests of the architectural, mechanical, engineering, contracting, electrical, railroad, iron, steel, mining, mill, quarrying, exporting and kindred industries, and is a reliable index, containing over 350,000 names and addresses and upwards of 25,000 business classifications. In order to give the reader some idea of the improvements and additions that have been incorporated it may be stated that while the fourteenth edition required 44½ pages to index its contents, the fifteenth edition, being that for 1906, requires 61½ pages, an increase of 17 pages, and as each page contains 412 classifications it will be seen that there are over 7000 additional classifications, each one of which represents the manufacturer, &c., of some specialty not printed in any previous edition.

One of the striking features of the work, and one which cannot fail to be appreciated by those using it as a work of reference, is the great number of trade names which are given in connection with the names of the firms under the classifications where they appear. It very often happens that we receive inquiries from correspondents as to the manufacturer of a certain make of goods which we cannot recall off hand and which would ordinarily require much time and labor to find. Under the new arrangement of the "Commercial Register" it is only necessary to turn to the list of manufacturers of the kind of goods in question and run over the names until the particular brand is found, in connection with which appears the name of the maker. In regard to some of the classifications of general interest to our readers, it may be stated that under the head of Contractors and Builders appears a list of names occupying 110 pages; of Architects, 25 pages; of Plumbers, Gas and Steam Fitters, 65 pages; of Masons' and Builders' Materials, 15 pages; of Lumber Manufacturers and Wholesalers, something over 30 pages; of Brick Manufacturers, 20 pages, &c.

The work is arranged with a great deal of care, and will be found a valuable aid as a buyers' reference for the architect, contractor, builder, manufacturer, jobber, and, in fact, all connected with the industries mentioned.

The San Francisco Earthquake and Fire. By A. L. A. Himmelwright. Pages, 270, 9½ x 11 in. Illustrations, 172. Published by the Roebling Construction Company, Price $5.

Mr. Himmelwright went to San Francisco in the interest of the Roebling Construction Company immediately after the disaster and devoted nearly three weeks to a detailed inspection of the fireproof buildings. In each case the exterior was minutely examined, and then each story was taken in turn, the halls were traversed, and extended notes were made on the spot of all features of interest. The results are presented in this book. In an introductory word the author says that, as at Baltimore two years ago, it was demonstrated that buildings could be so constructed as to be absolutely indestructible by fire. This has again been more conclusively proved in San Francisco, and the additional fact established that such buildings can also be designed to withstand earthquake.

In the earlier pages of the book a general account is given of the California earthquake and fire, and maps are presented, in which the burned district is outlined and its extent compared with that in Baltimore. The nonfireproof buildings are first taken up, but only brief treatment is necessary, as the investigation showed a a general failure of the walls of such buildings. The fireproof buildings, those whose walls, floors, roofs and partitions are of incombustible material, and in which the floor loads are supported by protected steel framing, stand out prominently in the midst of the ruin. In discussing the effects of the fire on these structures, Mr. Himmelwright presents 170 half-tone views, most of them full page engravings, illustrating with much detail the extent of the damage done by fire and earthquake. In connection with each view, its particular feature is pointed out, and details are given of fire and earthquake effects, after the construction has been described fully.

The author concludes and gives abundant evidence to sustain the view that the best modern practice in the design of foundations, exterior walls and steel skeleton has proved satisfactory, though a few details can be improved. The San Francisco fire, he considers, has narrowed down the problem of making these structures fireproof to two principal features—first, the protection of the openings in the exterior walls, and, second, the protection of columns in buildings which are to become receptacles of large quantities of combustible contents. He calls attention to the glaring omission of fireproof barriers for exterior openings in prominent San Francisco buildings, and says that this was the direct and sole cause of the damage and destruction to the interiors of nearly all the fireproof buildings. Had suitable devices been provided in the window and door openings it is stated that the interiors of these buildings would have been wholly preserved, so that the necessary repairs would have been limited to the restoration of the spalling and other exterior damage. The neglect noted was not for lack of such material in the market. Metal or metal covered frame and sash, wire glass glazing and inside and outside metal shutters can now be had in a variety of designs, and for the door openings metal and metal covered frames and doors are available.

Referring to the second of the two main points which he emphasizes, Mr. Himmelwright says that for column protection concrete, well anchored with interior anchors attached to the columns at intervals of 12 to 18 in., showed the best results for stores, lofts, warehouses and similar buildings. For office buildings, hotels and institutional buildings a protection 2 in. thick of this material is sufficient. A double layer of wire lath and plaster with an air space between, or 4-in. hollow tile blocks laid in cement mortar, with the space between the blocks and the column filled solidly with concrete or

mortar, will also fulfill the requirements. In all cases it is essential that the protection be securely anchored to the column, otherwise the expansion of the column and abnormal stresses and strains are apt to crack the protection and cause it to fall away. Other lessons of the fire are summarized as follows: The use of refractory materials for façades; concrete floor construction of recognized strength and fire resistance; reinforced concrete for partitions; the provision of a separate inclosure for vertical pipes independent of the column protection; metal treads for stairways; provision for the expansion of steel lintels and mullions; filling with incombustible material between all fireproof floor arches and the under side of the finished floor; sufficiently heavy supports and the avoidance of copper wire in metal lath and plaster ceiling construction; the provision of vaults of suitable design of reinforced concrete or brick, the small steel vaults and portable fireproof safes having proved ineffective.

Among the lessons taught by the earthquake the following are given: The avoidance of locations in close proximity to geological fault lines; the building of foundations sufficiently strong to enable the entire base of the building to move as a unit; the adoption of the steel skeleton frame method for the superstructure, using cast iron columns and reinforced concrete columns, girders and beam with caution, and in comparatively low buildings only; the use of the best materials and workmanship for wall construction; the use of steel for high chimneys and towers; the thorough anchoring of roofing tiles. On the general subject of the use of reinforced concrete the writer comments as follows:

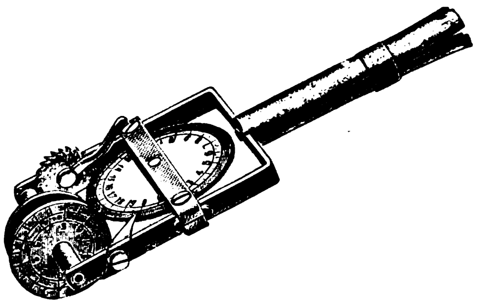
> It was conclusively shown in a number of instances in the recent conflagration that reinforced concrete girders and beams under identical conditions possessed much less fire resistance than steel members of the same carrying capacity. Reinforced concrete columns and girders are much more bulky than similar members of equal capacity in steel. In order to adapt concrete buildings to withstand earthquakes it would be necessary to provide an elaborate system of ties and braces, which would not only involve original and untested designs, but would also obstruct the head room with unsightly structural members.
>
> The success and safety of reinforced concrete depends wholly upon the uniformly good quality of the cement. A single barrel of damaged or poor quality cement going into the concrete of a column or a girder would create a weak spot and might at any time cause a fatal and expensive accident. Even under the most favorable conditions concrete girders and beams vary from 10 to 50 per cent. in actual strength when tested to destruction. This fact shows that it is not a uniform or homogeneous material like steel, and consequently it is less reliable.
>
> In view of the foregoing considerations, reinforced concrete is not as well adapted as steel for columns, girders and beams, and should not be used for this purpose where steel is available. The steel skeleton frame, consisting of columns, girders and beams, has thoroughly demonstrated its ability to successfully resist earthquake movements, and absolute dependence can be placed on it to retain its strength and integrity when subjected to the crucial test. It should be adopted in all cases for the better class of buildings, and particularly for hotels, offices, schools, institutions and similar buildings that are to be occupied by large numbers of human beings.
>
> Reinforced concrete has a useful and definite field in fireproof building construction. The facility with which reinforced concrete can be anchored to the steel members renders it particularly well adapted for curtain wall construction in steel skeleton frame buildings. Concrete also possesses better fire resistance than any of the ornamental stones, such as granite, sandstone, &c. Being a monolith, it can be built much thinner than materials consisting of assembled pieces, which would make it more economical. The complex stresses and strains that obtain in horizontal beam and slab construction, and the tendency of the dead load to deflect and warp, are wholly eliminated in vertical wall construction. The reinforcing metal can also generally be located in the mid-section, where it is much less exposed to fire.

The successful manner in which the tall buildings withstood the effects of the earthquake is particularly emphasized in Mr. Himmelwright's discussion. He considers that the San Francisco disaster has furnished conclusive proof that the principles involved in their construction are correct. Even the tallest buildings remained practically plumb. The high buildings of Chicago, which have never been subjected to earthquake shocks, show in many cases greater variations from the plumb than were generally noted in San Francisco. Referring to the degree of heat to which the interiors of the fireproof buildings were subjected, it is stated that the average maximum temperatures in office and hotel buildings, as determined by the fusing of metals and other phenomena, ranged from 1500 to 1900 degrees F. These maximum temperatures were probably not maintained for more than a few minutes.

The report deserves and will have a wide reading, since it is a unique and highly valuable contribution to the literature of modern tall building construction.

The Rotometer.

There is at present on the English market a measuring device, which is of special interest to architects, builders and, in fact, all engaged in the building and allied industries. It is especially serviceable where the use of a foot rule or tape measure is not convenient, and it is of such a nature that it can be employed in measuring floors, ceilings, the upper parts of doors, windows, &c., thus saving the necessity of stooping and avoiding the use of stepladders or other means of making elevated points accessible. The device is constructed on the principle of the cyclometer and is wheeled along the space to be measured, the distance being measured by means of two wheels and a dial on which is indicated the length in yards, feet and inches. It has a capacity from 1-16 in. to 20 yd. A ferrule holder, which constitutes the short metallic handle, enables it to be easily fixed to the end of a stick or it can even be utilized on the end of an umbrella. It is called a rotometer, and is illustrated in general view herewith.



The Rotometer.—A Device for Measuring Floors, Ceilings, etc.

Anniversary of the International Correspondence Schools.

Students of the International Correspondence Schools are much interested in the celebration of the fifteenth anniversary of the schools, which is to be held in Scranton, Pa., October 16. It has been nearly 15 years since Thomas J. Foster, then editor of a newspaper in Shenandoah, Pa., introduced a method of teaching through the mails by means of special home-study textbooks and a system of direction and correction of students' work, the object of which was to enable the coal miners of Pennsylvania to pass the required examination for mine foreman. Although the enterprise was of great interest in the mining communities, not even the founder then dreamed that his plan was the creation of a new educational system that was to turn the world into a vast classroom and afford the means by which practical, money earning knowledge in almost every line could be carried to the thousands who could not give up work or leave home to secure education.

The International Correspondence Schools report that they now have more than 200 courses of instruction. Up to the present time, 85,000 students have either completed the courses for which they enrolled or substantial portions thereof; 225,000 other students have completed the study of mathematical, physical and drawing subjects. One hundred and fifty-three railroads, including some of the largest systems in the world, have made contracts with the schools for the instruction of their engineers, firemen, machinists, inspectors and other employees. The widespread practical results of the work

of this great home-study university are demonstrated by the fact that during the last 12 months upward of 4000 reports of increased salary or advancement in position have been received from students. The foregoing figures are all the more wonderful when it is remembered that the largest number of students graduated by any one American resident school is 28,000, and this we are advised is the record of Harvard University, an institution more than 200 years old.

The anniversary celebration has been planned for October 16, the day on which 15 years ago the first student was enrolled. Students and many persons of national prominence in educational work are expected in Scranton on that day. The first student enrolled—then a common laborer, is now a mine superintendent. Few of the students have ever seen their teachers or the buildings and system of the schools at Scranton, and the event will not only be a notable one, as a testimonial to the founder, but will also be of great interest to visiting students. The day will be taken up with appropriate exercises, and an interesting exhibit of the schools at work preparing and printing home-study textbooks and correcting the recitations of students sent in from every part of the civilized world. A banquet to the guests will be given by the schools in the evening.

Proposed Builders' Exchanges Association.

An interesting effort to organize and establish a National Association of Builders' Exchanges is being developed by Edwin S. Williams, secretary of the Pennsylvania State Association of Builders' Exchanges, residing at Scranton, Pa. In a communication to the "Building Trades Employers' Association Bulletin" he states that letters were sent to the Massachusetts State Association of Master Builders, Minnesota State Association of Builders' Exchanges, Mississippi State Builders' Exchange, New York State Association of Builders, Ohio State Association of Builders, Pennsylvania State Association of Builders' Exchanges and Texas Builders' Exchange inviting them to meet with the Pennsylvania Association in the city of Scranton, Pa., January, 1907, to start the formation of a National Association of Builders' Exchanges, along the following lines:

"First, a central organization of all trades and supplies in the building business in each town and city. This association to elect three delegates to meet annually in convention as a State Association and then each State Association to elect three delegates to meet the following month as a National Association.

"My ideas in regard to the National Association would be that each State would supply some funds so as to employ a paid secretary and one or more paid organizers to go into the different States that have no association and get the different towns organized. I believe a representative of the national organization would have considerable weight with the towns and cities, providing they were the right kind of men. In our town and city organizations I would have every single individual member bonded to enforce strict discipline and obedience to orders. You may note that this kind of an organization could be conducted without a heavy burden of expense upon any one, as the State Association convention would never exceed 150 members and the National Association would never exceed 150 delegates, and a convention of that size could be entertained in almost any town or city. I am opposed to putting the burden of entertainment upon local exchanges, and believe each association should pay all expenses of their delegates. There was a National Association of Builders, but it became such a burden to the towns and cities that entertained the national convention that all the work they did was to strain every bit of energy in raising funds to pay off the bill of the banquet. I believe in enforcing discipline rigidly and compelling every member to pay up their dues and obey all resolutions and rules that are adopted by a majority vote of the exchanges.

"If these lines could be followed out it would be possible for us to protect builders in any town in which they might see fit to do any building. I believe in issuing the 'lockout' to protect any and every member of the exchange. If any union strikes unjustly against any member of our exchange in this city, we will 'lockout' the trade that strikes. Since January, 1903, we have 'locked out' the Stone Masons' Union, the Hod Carriers' Union and the Painters' Union in this city, solely for the purpose of protecting the individual members of our exchange."

Death of John Simonds.

John Simonds of the Simonds Mfg. Company, Fitchburgh, Mass, died at the residence of his son E. H. Simonds at Berkeley, Cal., on Saturday, September 8, after a lingering illness. He was born in Fitchburg in 1838, and after completing his studies in the public school of that place he went to Winchendon, entering the office of E. Murdock & Co., where he remained until after the breaking out of the Civil War. In addition to serving his three years' term he re-enlisted and served until July 13, 1865, three months after General Lee's surrender. After his return from the war he was for several years in the office of the Vermont & Massachusetts Railroad Company, and in 1874 he was elected treasurer of the Simonds Mfg. Company. This position he held until 1886, when he resigned and went to the Pacific Coast, where he started the Simonds Saw Company, of which he was president at the time of his death. He gave some attention to manufacturing, but the bulk of his business was handling the goods of the Fitchburg Company. He had a store in San Francisco until it was destroyed by fire immediately following the earthquake of April 18, since which time his business was located in Oakland. In referring to his character a local paper said: "His life was a success in the best sense of the word, and his name will have a high place among the sons of Fitchburg."

Death of a Providence Architect.

Edmund H. Willson, one of the prominent architects of Providence, R. I., died at Petersham, Mass., September 9, aged 51 years. He was a member of the firm of Stone, Carpenter & Willson for more than half a century, during which time he designed many of the important buildings of Providence and vicinity, among them the Providence Public Library, a number of the best of the Brown University buildings, the Pendleton Museum and Roger Williams Chapel. Mr. Willson was born in Salem, Mass., April 21, 1856, the son of Rev. E. B. Willson, D.D. He graduated from Harvard in 1875 and from there went to the Massachusetts Institute of Technology and later to the Ecole des Beaux Arts, Paris, to complete his study of architecture. Upon his return to America he entered the employ of Stone & Carpenter of Providence and a year later was admitted to the firm, the name being changed to Stone, Carpenter & Willson. He was a member of the American Institute of Architects and of Rhode Island Chapter. He leaves a widow and two daughters.

◆◆◆

THE class in architectural drawing at the night school of the Twenty-third street building of the Young Men's Christian Association, New York City, will be conducted the ensuing season by Eli Benedict, architect, as heretofore. The class is designed to help young draftsmen and beginners in the study of architecture, and sessions will be held on Monday and Thursday evenings of each week from October 1 to May 29 of next year. Mr. Benedict will also continue during the coming season an office class in his drafting room, No. 1947 Broadway, which will meet outside of business hours at the convenience of members.

A PRIVATE residence, which will cost something over $300,000, is about to be erected just east of Fifth avenue on Eightieth street, in accordance with plans prepared by C. P. H. Gilbert, 1123 Broadway, New York City. The new residence will be six stories in hight, fireproof throughout, and will cover an area 40 x 100 ft. in size. The old buildings now on the site are being demolished by the New York House Wrecking Company.

Twenty-sixth Season of the New York Trade School.

The twenty-sixth year of the New York Trade School, First avenue, Sixty-seventh and Sixty-eighth streets, New York City, will commence on October 1 with evening classes in various branches of the building trades. Since the school was founded in 1881 by the late Col. R. T. Auchmuty 12,648 young men have attended, and during the past four years the annual attendance has averaged over 800 students. The buildings of the school are arranged with a view to securing large floor area and ample light and ventilation. The shops are steam heated, and at night are lighted by electricity. The equipment of the respective workshops of the school affords every facility for instructive purposes, and each student is provided with all necessary tools and materials, with ample bench room. In connection with the school there is maintained a students' dormitory, where young men who come from distant points may obtain accommodations.

The term of the evening classes opens on October 1 and the day classes on December 10, all terminating on the following April 3. In the class in carpentry a thorough and practical course is provided in house carpentry and framing, including also the drawing of plans. The course in plastering covers lathing, scratch and brown coat work and hard finishing and cornicing. In bricklaying, in which there are both day and evening classes, instruction is given in building walls, fireproof brickwork, &c., as well as a consideration of the properties of mortar and cement and how they should be mixed; arches, flues, foundations, bonding, &c.

There are day and evening classes in bricklaying, cornice and skylight work, general pattern drafting for sheet metal, steam and hot water fitting, house, sign and fresco painting, plumbing and electrical work. The trades which are taught evenings only include blacksmithing, plastering, tile laying and pattern making. A comprehensive catalogue has been issued covering the school year 1906-1907, which gives full particulars relative to the various courses of instruction, together with tuition and other information likely to be of interest to those contemplating a course in this institution. A copy of it can be obtained on application to the address given above.

◆◆◆

Municipal Buildings for San Francisco.

The Board of Supervisors of San Francisco has directed the Board of Public Works to prepare plans and specifications, estimates of cost, &c., for the construction of a three-story frame building designed to accommodate all departments of the city government formerly quartered in the City Hall. The building is to be erected on Hayes street, between Van Ness avenue and Franklin street. It will have a frontage of 412 ft. 6 in. and a depth of 137 ft. 6 in. It is believed that the building will cost between $40,000 and $50,000. It will be used until a permanent City Hall can be built.

In accordance with the direction of the Board of Supervisors, the Board of Education has drawn up a list of the new buildings required by the city's educational department as a result of the late fire. The list includes 12 new buildings, ranging in cost from $38,000 to $119,000. The aggregate cost of the buildings will be $1,019,000.

A temporary Superior Court Building has been planned for construction at the corner of Hyde street and Golden Gate avenue, and while the matter has not been finally decided on, it will probably be erected. The building will be 137 ft. 6 in. square and two stories high.

Chief Engineer Shaughnessy of the San Francisco Fire Department reports that approximately $18,000 has been spent since the fire in the construction of new engine houses, and that $60,000 additional is required to complete the work.

◆◆◆

Preparations are in progress for the erection of a $30,000 hotel at Tullahoma, Tenn., the material to be either brick or hollow blocks. Several cottages are to be remodeled and pavilions built with a view to making a most complete summer and winter resort. The leading spirit in the undertaking is Doak Aydelott, secretary of the Tullahoma Fair Association, who is desirous of opening correspondence with architects regarding plans for the improvements.

The contract for the construction of a large machine and forge shop of reinforced concrete has just been awarded to the Underwriters Engineering & Construction Company, 1170 Broadway, New York, by the Stayman Mfg. Company, Jersey City, N. J. The plant will be constructed on the cost-plus-a-fixed-sum basis.

Among the contracts recently awarded for building improvements in the city of San Francisco, Cal., is that for the modern fireproof building for the Alaska Commercial Company, which has been secured by the George A. Fuller Company, the cost of the structure being placed at $500,000.

Plans are under way for three more model tenement houses, which will be part of the series of "model tenements" in New York City for which Henry Phipps donated $1,000,000 about a year ago. There will be accommodations for 166 families, and the cost is placed at about $300,000. They will be located on the north side of Sixty-third street, a little east of West End avenue, the largest covering a plot 87½ x 100 ft., and the other two 50 x 87½ ft. each.

CONTENTS.

Editorial—

Correspondence—

Novelties—

PAINTED TIN
GALVANIZED TIN

THIS IS THE AGE OF THE

METAL SHINGLE

INFLAMMABLE WOOD SHINGLES, HEAVY SLATE, BRITTLE TILE
AND UNSIGHTLY PAPER OR TAR HAVE SEEN THEIR DAY.

And the reason is that the NEW CENTURY METAL SHINGLE is the natural evolution of the shingle question.

They are fire proof. They are light. They are unbreakable. They are artistic—and then beyond that are qualities of durability, strength, beauty and quick adjustment—all its own.

Note the appearance of just one building roofed with NEW CENTURY METAL SHINGLES and then compare it with the cheap, common kind done in wood, slate, paper or tar.

And then figure on this—that they're cheaper than wood, cheaper than anything when you figure all the saving points involved—insurance, protection etc.

NEW CENTURY SHINGLES are handsome embossed design, the lock is simple easy, perfect.

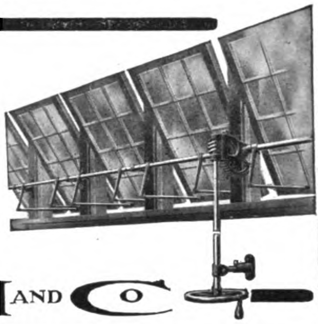
Don't fail to get the book, No. 25, we send you free, and post up on the roofing question, comparative costs, estimates, designs, etc. Address,

CHATTANOOGA ROOFING & FOUNDRY CO., Chattanooga, Tenn.
New York Office, 440 Greenwich Street.

H AND C

THERE'S PLENTY OF CHEAP SASH OPERATING APPARATUS

the kind that's made of light materials—the worms in the gear not machine cut—the bearings not finely adjusted. If you want a good thing to do a good job, you've got to pay for it. Ours is a good thing at the right price for a good thing.



HITCHINGS AND COMPANY,
GREENHOUSE DESIGNERS AND BUILDERS,
Manufacturers of Heating and Ventilating Apparatus.
1170 Broadway, - - - - NEW YORK.

H AND C

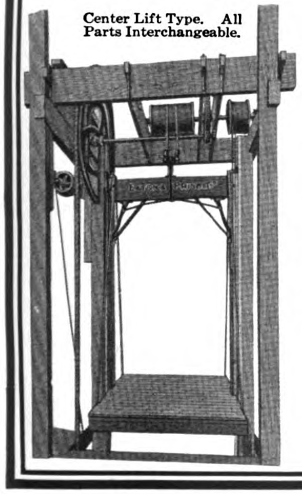
When It Comes To

Hand Power Elevators

Use

THE EATON & PRINCE

Center Lift Type. All Parts Interchangeable.



THEY are safe, economical, and easy to operate. Are the kind you seek and do not always find. Specify our elevators in your contracts and *please your customers.* You'll be interested in our booklet No. 50 on Safety Gates, Doors, etc. It will give you valuable information and is sent free for the asking.

EATON & PRINCE COMPANY
CHICAGO

A Catalog Of Sash Operating Apparatus

Most Catalogs Are Quite Alike

So is this one—but the way we shift one sash or 100, is not like other devices—that is to say, in what our device does and the way it does it. The way it does it is where the catalog comes in.

Send for it.

The long or short run in ventilation is pretty thoroughly discussed in this catalog.

LORD & BURNHAM CO.
1133 Broadway, cor. 26th St.,
NEW YORK
BOSTON BRANCH: 819 Tremont Building.

A BOOK FOR EVERY MECHANIC

The Workshop Companion.

A Collection of Useful and Reliable Recipes, Rules, Processes, Methods, Wrinkles and Practical Hints, for the Household and the Shop.

By JOHN PHIN.

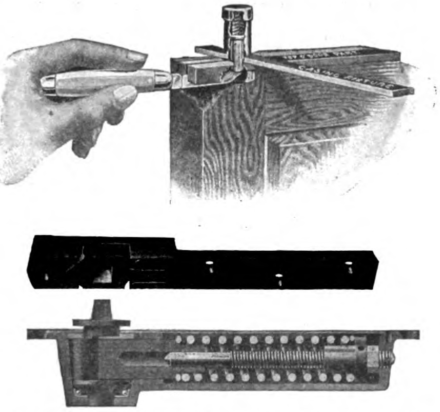
164 pages, 12mo, neatly bound in cloth. PRICE, 50 CENTS, POSTPAID

DAVID WILLIAMS CO. - 14-16 Park Place, New York.

NOVELTIES.

Improved Columbian Floor Hinge.

The Columbian Hardware Company, Cleveland, Ohio, with a branch office at 168 Church street, New York, has improved its floor spring hinge by an alignment adjuster, which is referred to as very simple and practical. The hinge with the adjuster shown above is illustrated in Fig. 1 of the cuts. The adjuster is made of malleable iron and consists of two castings, and with the aid of two small screws located in the side, the door can be thrown into line. If through carelessness upon the part of the carpenter the door does not hang at right angles, it may be quickly adjusted to hang perfectly true. The door can be taken down by turning it at an angle with the casing, and inserting a knife blade or nail in the slot of the fixture on the top of the door and pushing up the pivot which is held in place by a spring. The door can then be removed, the whole operation taking less than a minute, without disturbing the tension on the spring or removing any parts from the door. The tension of the spring can also be adjusted without removing the door.



Novelties.—Fig. 1.—Improved Columbian Floor Spring Hinge.

Through 'Frisco's Furnace.

Under the above title has been issued an attractive publication of many pages, bound in colored covers and illustrated by seven half-tone engravings, showing modern steel frame buildings which withstood the San Francisco calamity of April 18. The publication tells, in most interesting style, of the originality of the American architect and engineer and of the stability of steel skeleton buildings under the crucial test of earthquakes, dynamiting and fire. The main purpose, however, of the publication is to show the excellent manner in which Dixon's silica graphite paint "preserves the maximum strength of the steel work of high buildings so as to successfully resist severe strains." In the case of the James Flood Building, the basement and first story steel work was painted, when erected in 1904, with two coats of the paint in question, and the condition of the paint when examined after the fire showed that it had "perfectly preserved the maximum strength of the steel work." A striking illustration of what the paint will withstand was shown in connection with the Robert Dalziel Building, the unfinished steel work of which was painted dark red and natural colors. Other examples were the Wells-Fargo Express Building, the Whittell Building, the Mutual Savings Bank Building and the Kohl Building. On the first page of the publication is an illustration showing the comparative areas burnt over in America's four great fires; namely, Chicago, 1871; Boston, 1872; Baltimore, 1904, and San Francisco, 1906. Those of our readers who are desirous of securing a copy of the de luxe edition of "Through Frisco's Furnace" can secure it by addressing the Joseph Dixon Crucible Company, Jersey City, N. J., and mentioning *Carpentry and Building* as the journal in which they saw the notice.

Standard Continuous Concrete Mixer.

A machine which is said to be the result of a series of experiments covering a period of more than two years, and which were carried on by the inventor with the sole object of obtaining a practical mechanical mixer for his own use in the manufacture of concrete blocks is illustrated in Fig. 2 of the engravings. It is known as the Standard Continuous Concrete Mixer, and is built in two styles, the stationary form shown herewith being designed for concrete block work, while a portable form is intended for use in the building of sidewalks, curbings, sewers, &c. The machine consists of a large hopper for sand and gravel, a smaller one for cement, a mixing trough, a shaft provided with mixing and conveying blades operating within the trough, and means for distributing water to the materials after they are thoroughly "dry mixed." The Standard Machine Company, Kent, Ohio, which makes the machine in question, states that a special feature of it is the simple and efficient mechanism for feeding the materials from the hoppers. By changing the position of a single hand lever, the operator can adjust the two feeds simultaneously to deliver any desired output within the capacity of the machine without changing the proportions of the materials and without changing the speed of the driving shaft, or he can stop the feed entirely without stopping any other part, thus continuing the operation of the mixer shaft and cleaning out trough. The claim is made that this device feeds equally well sand and gravel, dry or wet—a feature which contractors cannot fail to appreciate. All parts of the mixer are interchangeable, and those liable to wear are designed to be easily replaced. The manufacturer points out that the requisites to the successful manufacture of concrete blocks are: First, that the materials shall be properly proportioned for the kind of work desired; second, that the materials shall be thoroughly and evenly mixed; third, that the "dry mixed" material shall be thoroughly and uniformly "tempered" by adding water and stirring to a uniform consistency; and fourth, that the "tempered" concrete shall be molded into its final shape as soon as possible after tempering. Too much cement in the composition is a waste of valuable material, while a certain minimum proportion is absolutely indispensable, and the claim is made that with the Standard Continuous Mixer the materials can be proportioned exactly as desired.

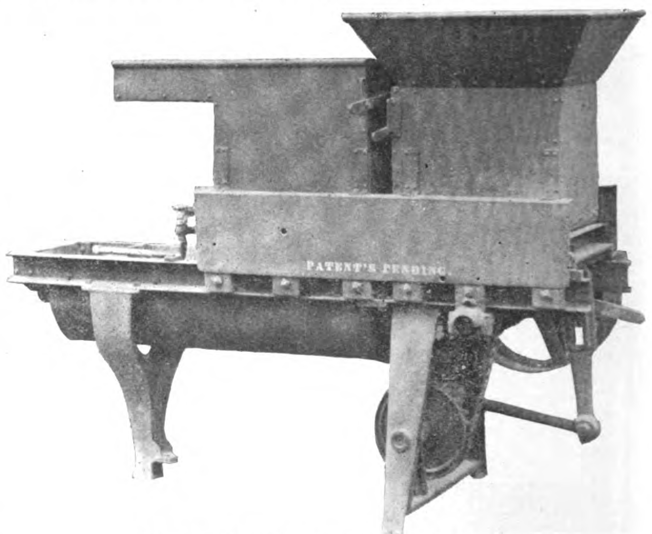
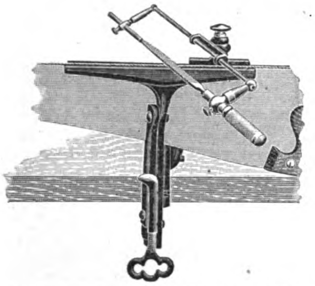


Fig. 2.—Standard Continuous Concrete Mixer.

The "Knodust" Floor Oil.

A floor oil especially designed to eliminate a great deal of the work necessary in cleaning the floors of buildings after the plasterers have finished their work and to render them presentable when the building is ready for occupancy, has just been

placed on the market under the trade-mark "Knodust," by the Modern Novelty Company, 126 William street, New York City. The claim is made that this special oil is such that a light, even coat of it, put on as soon as possible after the floors are laid, will prevent their staining from tobacco juice, grease, or plaster, and at the same time the floors will not absorb water and consequently will not be subjected to repeated swelling and shrinking. The point is also made that the water will evaporate from all plaster falling on the floors, leaving it in a sandy condition so that it can be swept up when desired, leaving no stain. After a building is finished, it is suggested that the floors should receive a scrubbing to remove such fine dust as will not sweep off, and after they are dry they can be stained and varnished, and rugs and carpets laid, as there will be no danger of staining the latter with the oil. The company calls attention to the fact that this special oil is not intended for use on fine hardwood floors, laid after the plastering is done, as the proper dressing for such floors is the regular "Knodust" floor oil. The company suggests that all floor oils and polishes should be put on with a Universal Oiler, which insures a light, even coat, as putting on too much oil is a waste of money. The company is a manufacturer of wax polish for floors, etc., and circulars relating to the goods can be obtained by contractors and builders who may be interested.



Novelties.—Fig. 3.—The Foote Saw Filing Guide.

The Foote Saw Filing Guide.

The J. B. Foote Foundry Company, Frederickstown, Ohio, is offering the saw filing guide, illustrated in Fig. 3, which is attached to the company's No. 3 saw filing vise. The guide is substantially constructed, with all parts made of machinery steel, including the handle and the thumb screw. The handle is adjustable, as well as the part that holds the small end of the file.

Barnett's New Door Check and Spring.

All of the working parts of the door check and spring shown in Fig. 4 of the accompanying cuts are of malleable iron and steel. The brass air cylinder is entirely closed at both ends to exclude dust and grit, and the extra powerful coiled spring of round steel wire is incased. There is no reservoir of oil. The spring has an adjustable tension and may be reversed from right to left-hand doors without changing the spring. As the spring has no initial tension it can be quickly removed and replaced. The check is placed near the center of a door, thereby, it is remarked, relieving strain on the door and hinges. By the use of a simple bracket, the check can be attached to the outside of a door. The check can be applied in a few minutes with the use of a screw driver and it is explained that when properly attached it will render long and efficient service without requiring any repairs. The check is put on the market by the Oscar Barnett Foundry Company, Newark, N. J.

Royal Standard Surfacer.

A very strong and substantial machine which it is claimed will do smooth planing on hard or soft wood is the No. 2½ Royal Standard Double Belted Surfacer, illustrated in general view in Fig. 5 of the accompanying engravings. The frame is heavily ribbed, and the table is fitted to it in a manner which is claimed to be a decided improvement. The table slides on the outside of the frame, the slides being 14 in. long and provided with adjustable gibs to take up the least wear. The claim is made that this construction insures an absolutely steady table and consequently perfect work free from waves and clipped off ends. The table is raised and lowered by a crank handle in convenient reach of the operator, while an index shows at a glance the thickness to be planed. The steel cylinder is driven by two belts and revolves in self-oiling bearings. The rolls are made of steel and revolve in long boxes that are adjustable. The feed is very powerful and so arranged that the upper rolls can raise the full limit without the driving gear getting out of mesh, a point which the wood worker is very likely to appreciate. The feed can be stopped and started instantly. The in-feeding roll is fluted and has weight pressure, while the out-feeding roll is smooth and has spring pressure. According to the manufacturers, the Cordesman-Rechtin Company, Butler street, Cincinnati, Ohio, the counter shaft has tight and loose pulleys 10 x 5½ in. and should make 1050 revolutions per minute.

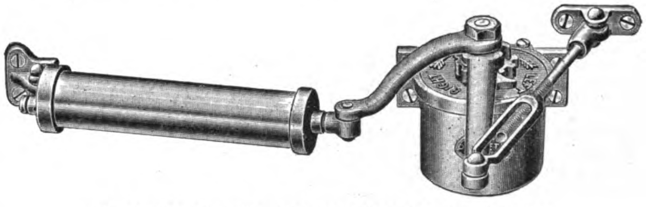


Fig. 4.—Barnett's New Pneumatic Door Check and Spring.

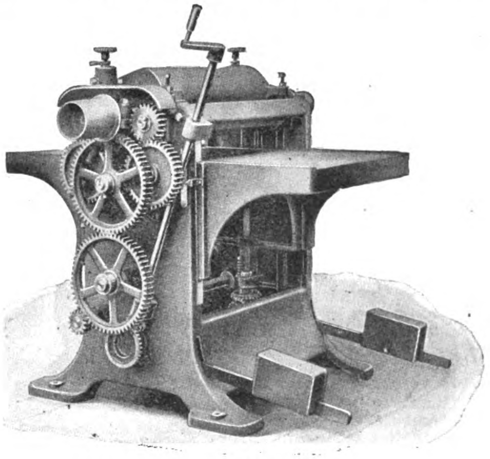


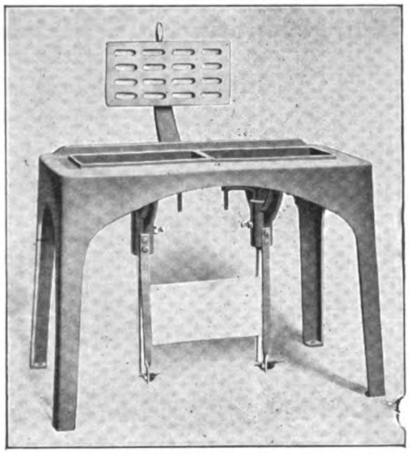
Fig. 5.—Royal Standard Surfacer.

The "Medusa" Waterproof Compound.

In the belief that the life of the cement-building industry depends upon houses being made waterproof, the Sandusky Portland Cement Company, Sandusky, Ohio, has brought out and is introducing to the trade a substance which is offered under the name "Medusa." When a very small quantity of this is added to Portland cement the claim is made that it renders the mortar or concrete made from the cement practically impervious to water. Attention is called to the fact that hollow concrete blocks made with cement to which 1 per cent. of the "Medusa" compound has been added, with five parts sand and gravel, resists water better than blocks made in the proportion of one to two without the compound. The company states that the experiments which it has made indicate that the waterproof compound also prevents the white efflorescence which so often renders cement work unsightly and at the same time prevents the appearance of hair cracks on the surface. Attention is called to the fact that this waterproof compound will be found especially useful not only in making building blocks, but also in making cement plastering, roofing tile, cellar walls, cistern and reservoir linings, sewer pipe, elevator pits; and in a multitude of other uses in which resistance to percolation of water is required. A little pamphlet which the company has issued shows the results of tests under heavy water pressure to which the compound has been subjected, and also the results of tests for water absorption of concrete blocks made of cement in which the "Medusa" waterproof compound had been introduced.

Hand Power Cement Shingle Machine.

Among the many uses to which cement is being adapted at the present day is that of the manufacture of shingles for covering the roofs, gables and walls of buildings of all kinds. A machine which is manufactured by Wickes Brothers, successors to the United States Cement Shingle Machinery Company, Saginaw, Mich., is of such a nature as to turn out reinforced Portland cement shingles in various forms, and which it is claimed can be laid on any roof, whether it be new or old. The shingles have already stood most severe tests, with entirely satisfactory results, their lasting qualities and adaptability having been proven in the most practical ways. They are made of Portland cement over a metal reinforcement that terminates in loops at either side for nailing securely but not rigidly, to resist the action of ice, expansion and contraction, and the claim is made that they can neither break nor fall. They are ½ in. thick at the butt, slightly tapered and of any width, shape or color. With the patent hip shingle and ridge of the same material these shingles are said to constitute a perfect and complete covering and are easily laid and cut for valleys, towers, dormer windows or any portion of a broken roof. We present in Fig. 6 of the illustrations a general view of the hand power machine turned out by Wickes Brothers, with which they furnish the equipment and necessary attachments which are necessary for making plain or fancy shingles. From this it will be seen that only one machine is required to make all material necessary for a plain or fancy roof. We understand that the demand for these shingles is steadily increasing as they become known, for, as the makers express it, "an article of real worth and merit is bound to command the attention of the public." A pamphlet which has been issued relating to cement shingles and the machines for making them gives a great deal of interesting information and is illustrated by means of halftone engravings of buildings which have been covered with shingles of this nature.



Novelties.—Fig. 6.—Hand Power Cement Shingle Machine.

Additions to Metallic Shingle Plant.

The many and varied uses of metallic shingles for roofing purposes, which has developed so rapidly during the last five or ten years, and more particularly during the last year or so, has compelled manufacturers of these goods to add materially to their facilities for their production. The Cortright Metal Roofing Company, Philadelphia, Pa., which has one of the largest plants devoted exclusively to the manufacture of these goods, has recently made large additions both to plant and equipment in order to meet this growing demand, and now has a productive capacity of from 60,000 to 75,000 shingles per day, the varying number being dependent upon the sizes of the shingles made. Facilities have been arranged so as to enable them to carry upwards of two thousand boxes of tin plate in stock. New machinery having a capacity of fourteen thousand 10 x 14 shingles per day has been installed and the floor space devoted to their arrangements for drying the shingles after painting—which is done by a method which insures perfect coating of every part of the shingle, with paint manufactured after their own formula which has been the result of years of experience, has been increased to 7000 sq. ft. The large demand for galvanized shingles has made it necessary for them to increase the capacity of their galvanizing department, which has been doubled. This, like the painting process, is the final one in the making of the shingle and makes possible the perfect coating of the same, avoiding any possibility of the breaking of the coating at the seams of the shingle, which might be possible should it be made from a galvanized plate. The demand for metal slates and shingles as well as their specialties, as noted by the Cortright Company, has been larger during the past year than ever before; each month's sales have been greater than that of its predecessor, and the demand for the 10 x 14 sizes aggregated about 75 per cent. of the total volume of business, showing this to have been the most popular size. The recent additions made by the Cortright Metal Roofing Company will enable them to increase their capacity fully one-third, and they will now be able to supply the demand for shingles, slates, ridge coping, valleys, and other specialties, either painted or galvanized as may be desired, more expeditiously than heretofore.

The Baldwin Concrete Mixer.

With a view to meeting the requirements of those having occasion to mix concrete in these days, when hollow block and cement concrete construction is growing so rapidly in popular favor, the Waterloo Cement Machinery Company, Waterloo, Iowa, has placed on the market a mixer for hand power operation, which embodies features that cannot fail to command the attention of contractors and builders all over the country. Reference is made by the maker to the ease of manipulation; the brief space of time required to mix a batch of concrete; its economy and simplicity. A general view of the exterior of the Baldwin hand mixer is shown in Fig. 7 of the engravings. In regard to the interior construction, it may be stated that the drum is absolutely plain, with the exception of three shears, which carry the material to 45 degrees before dropping it. The water is applied by means of a 2 in. shaft perforated at the bottom, an arrangement which keeps the water from washing the sand and cement. The arrangements of parts is such that the mixer does not clog or fill up inside. The claim is made that the machine is built for service, and its rapidly growing use by manufacturers of concrete building blocks and sidewalk makers is striking testimony to its popularity. The Baldwin mixers are made in ⅛ and ¼ yd. sizes, with or without trucks, but larger mixers can be built to order for engine power. With the ¼-yd. size it is stated a batch of concrete can be turned out in about five minutes, thus giving a capacity of 3 yds. per hour.

Fig. 7.—Baldwin Concrete Mixer.

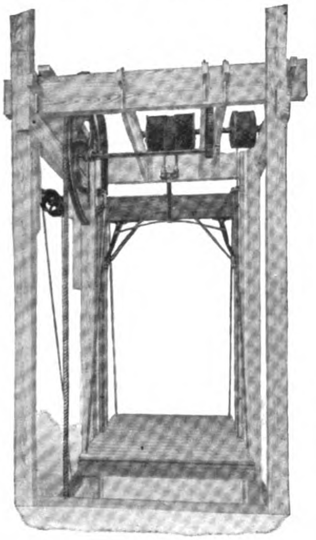
Bender's Slide and Folding Rule.

A rule designed especially for the use of carpenters and builders for quickly and correctly taking measurements between two points, has

been placed upon the market by J. Bender, Marion, Kan. The rule is such that it can be adjusted to any length from 2 to 8 ft., thus making it practical for the measurement of nearly all doors, windows, closets, trimmers, headers and braces, as well as all kinds of frame and finish work. The rule is made of No. 1 boxwood, is brass bound and is spaced in feet, inches and fractional parts. There are two inner sections which slide in opposite angles, one of the angles being provided with a thumb screw, which fastens the sections, when extended, to the required points. Joined by a hinge to the end of each of the inner sections is an outer section. These are provided with beveled catches in such a way that one engages the other automatically. The extreme ends of the outer sections are beveled to measure from a mitered joint. When measuring between two points it is simply necessary for the operator to use the slide and to reckon from the inside of the angles.

New Hand-Power Elevator.

The hand power elevator manufactured by the Eaton & Prince Company, Chicago, and which is illustrated in Fig. 8, is said to possess several new distinctive features, which represent the outgrowth of twenty-five years' experience in elevator manufacture. One of the most interesting, practical and essentially important features of the company's center lift pattern is the brake device, shown in Figs. 9 and 10. It consists of a double shoe working on each side of a band, which is cast to the arms of the ropewheel. Each shoe has a bearing on the band, this feature enabling the operator of the elevator to lower his car filled to its utmost capacity, with the aid of the forefinger and thumb only on the brakeline. This brake device is operated by means of an endless cord running around the sheave on the screw shaft of the brake, as shown. Another point of improvement is a locking device, which prevents the car from running up into the ceiling. By its use the car is at all times under the control of the operator and cannot move in either direction until the brake is released. A beam spring safety device is also a new feature and is shown in Fig. 8. In the event of the cables breaking this locks the car to the guides, preventing its dropping.



Novelties.—New Hand Power Elevator.—Fig. 8.—General View of the Elevator.

Encaustic Metal Ceiling.

Encaustic metal is a trade name given to ceilings and side walls made of sheet steel covered with a patent process enamel burned on the metal and decorated in various colors and shades, including gold decoration. It is made solely by the Wheeling Corrugating Company, Wheeling, W. Va., which has prepared an elaborate catalogue, including a number of color plates to give an idea of the effects available with different designs and coloring. A main feature is that the pressed sheet steel forming the base of the ceiling or side wall is coated on both sides with the enamel, which has been developed to secure a hard and elastic surface and yet one that is not brittle. The result aimed at is a metal that cannot rust because of the protective coating on both sides and of a surface that requires no painting, so that there are no delays on completing the erection of the ceiling or side wall. The enamel surface is designed to resist attacks from the elements and owing to its glass-like surface can, when soiled or smoked, be readily cleaned by means of a wet sponge and a little soap, with the subsequent application of a dry cloth. A point on which emphasis is laid is that the gold used in the decoration is one that will not tarnish. Each coat of enamel as well as the gold decorations is burned onto the metal under the action of heat. The color plates are, of course, distinctly valuable in forming an idea of the possibilities of the encaustic metal in the way of decoration, and a considerable number of reproductions of photographs of different designs, such as borders, corners and fields, aid in a selection. A practical feature of the publication is an extended list of directions on how to order and apply the ceilings, and from the number of letters printed from users it is evident that encaustic metal is not an experiment, but has passed the skeptical stage.

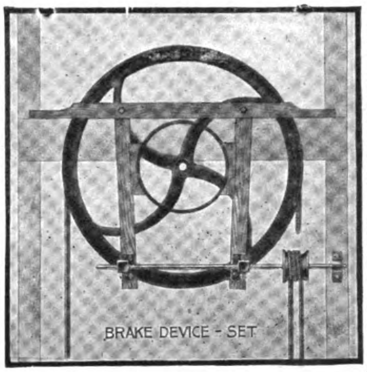


Fig. 9.—Showing the Brake Device Set.

Catalogue of Woodworking Machinery and Mill Supplies.

A very attractive catalogue of woodworking machinery and mill supplies for builders, contractors, carpenters, pattern and cabinet makers, furniture workers, etc., and consisting of 300 pages bound in paper covers reaches us from the "Oliver" Machinery Company, with general offices and works in Grand Rapids, Mich. At the very outset the announcement is made that the company has established a branch office and show rooms at 201 to 203 Deansgate, Manchester, England, where a varied assortment of "Oliver" wood trimmers, heavy power driven machines, small tools and supplies are displayed. The company has also established a new branch office at 120 Liberty street, New York City, where the management will be pleased to welcome those desiring goods of the character indicated. The lines shown in the catalogue embrace a great variety of woodworking machinery and, in connection with the illustrations, are ample descriptive particulars of special interest to the woodworker. In many instances the illustrations are half-tone engravings which show the finished machines with fidelity to detail. A telegraphic code and a comprehensive index are features which will be found convenient for reference for ordering goods by wire. The company states that the book has been made as comprehensive as possible, and that a great deal of space has been given to the subject of general dimensions of the machines produced, so that operators and buyers of machinery can fully understand just what they are getting when they purchase the goods of the concern.

Artistic Bathroom Fittings.

Silver & Co., 314 Hewes street, Brooklyn, N. Y., have issued Catalogue No. 14, devoted to their artistic bathroom fittings, and consisting of 112 pages, profusely illustrated with toilet paper holders in an immense variety of styles, nickel plated and glass towel rods and bars and combination towel bars and shelves, with tumbler holder attached. Sponge baskets, match and soap holders, comb and brush holders, and combinations of these useful fixtures are shown in great variety. Another interesting line is their tumbler and tooth brush holders, some with soap cups attached and some with special places for holding tooth powder boxes. Whisk holders and ash trays are followed by hat and coat hooks, especially adapted for bathroom and toilet room use. Thermometers and bathtub seats are followed by an extensive line of square and oval mirrors, medicine closets, bathroom mats and stools, shower rings, shower baths, scales and night lights for bathrooms. A number of pages are devoted to a price-list of many of the specialties shown, and a special sheet gives the discounts to the trade.

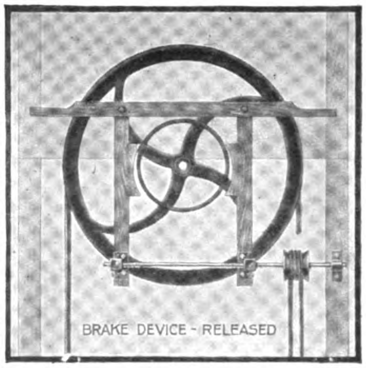


Fig. 10.—The Brake Device Released.

The Semi-Circular Level, Plumb and Inclinometer.

A tool which will be found of more than ordinary interest and value by carpenters, builders, masons, contractors, plumbers, steam fitters, millwrights, decorators, and, in fact, artisans in all branches of trade, is the semicircular level, plumb and inclinometer which is being put on the market by the Ingram Company, 65 and 67 Main street, Bradford, Pa. The tool is made of cherry, the top and bottom being bound with solid aluminum. The claim is made that the device is perfectly straight and true, and that there is absolutely no warp or twist. The upper scale represents the inches of raise or fall to the foot, graduated to ¼ in., so that in a distance of 2 ft. it is necessary to multiply by 2, and in a distance of 10 ft. to multiply by 10, and so on for any distance. Below the circular tube is a 90 degree scale, figured both ways from the horizontal to the perpendicular, and *vice versa*. All dials are solid brass and can be read from either side. The arrangement of the device is such that it can be readily mounted on a tripod for determining grades, foundations and excavations. Every part is easily and quickly adjusted, and the claim is made that all figuring is dispensed with except plain multiplication. The manufacturer refers to it as simple and practical in construction, absolutely accurate and of attractive finish.

TRADE NOTES.

The Duby & Shinn Mfg. Company, Incorporated, is now branching out as manufacturer of a general line of Mechanics' Fine Tools, with the Universal Square as its leader. This tool comprises Try Square, Bevel Square, Pitch Cut Square, and Hip and Valley Square. It is also a correct rule, lumber gauge, straight edge, plumb and level, and depth gauge; draws circles, lays out mortises and tenons, octagon cuts, &c. For all these uses it requires no adjustment, and is fully guaranteed. The company has purchased a large parcel of land, with a two-story building, at Branchport Station, Long Branch, N. J., and for the past two months has been getting ready for operations. The plant is now running with a full force, and there will be no further delay in making shipments.

Johnson's Prepared Wax for furniture, woodwork and floors, is the subject of an important announcement in another part of this issue by S. C. Johnson & Son, Racine, Wis. The point is made that the wax is equally as good for furniture as it is for floors and woodwork, and that when the wax is applied with a cloth over varnish, shellac or to the bare wood and Johnson's polishing Mitt or dry cloth is used for rubbing it, a beautiful, artistic and lasting polish is secured. The Mitt is referred to as the makers' latest invention, and while it is not necessary to use it when polishing furniture and woodwork it is recommended, because it saves time and labor and produces fine work. It is made of sheepskin with the wool adhering, and is open across the back so as to slip on the hand. In their announcement this month Messrs. Johnson & Son make a "Free Mitt Offer" which is likely to interest some of our readers.

Those of our readers who have occasion to use saw clamps are likely to be interested in the device placed upon the market by the C. W. Cardwell Mfg. Company, Jamaica, N. Y., and which is shown in its practical application in the company's advertisement in another part of this issue. The claim is made that the clamp can be placed on the edge of a bench, a timber, a board, or, in fact, almost anywhere, and that when not in use it occupies but little space in the carpenter's tool chest. Its weight is only about 1 lb. and its merits are claimed to be such that "no carpenter can afford to be without it."

The Standard Building Construction Company, Tenth and Duquesne Way, Pittsburgh, Pa., has issued a very interesting pamphlet calling attention to "a rapid, low-priced method of producing beautiful fireproof residences." The term "Standard Building Construction," as applied by the company, is to manufacture Standard sections of reinforced concrete suitable for the building of residences, school houses, apartments and, in fact, all classes of light building construction not exceeding four or five stories in hight. These sections are sent to the building site ready for assembling. The illustrations show concentrated and distributed load tests; also models of "Standard Building Construction," which are now on exhibition in the rooms of the Builders' Exchange in Pittsburgh. The claim is made that the weight of this form of construction is much less than that of brick or stone, while possessing greater strength.

"A City Water Supply for Country Homes" is the title of an attractively illustrated pamphlet sent out by the Kewanee Water Supply Company, Kewane, Ill., and relating to the Kewanee pneumatic waterworks outfits for supplying water to country residences, farms, villages, public buildings, &c. In regard to the "outfits," the statement is made that the Kewanee pneumatic tank is generally placed in the cellar of a building or underground, where the tank and pipes leading to and from it are protected from the weather, so that the water is delivered at an even temperature the year round. The claim is made that a pressure of 50 lbs. is easily obtained, and that this is equal to the pressure from an elevated tank 115 ft. high. This affords an excellent means of fire protection and enables the occupants of a dwelling to have the sanitary conveniences of a city home. The pamphlet in question carries a number of halftone illustrations of buildings of various kinds, in which the "outfits" have been installed, and these are accompanied by numerous testimonial letters, showing the satisfaction which the apparatus has given to those who have practically demonstrated their merits.

The New York Metal Ceiling Company, 537-541 West Twenty-fourth street, New York City, has decided to double the size of its plant. The business was started on a very modest scale about 16 years ago, and has outgrown the 30,000 square feet of floor space now occupied. The company has increased its capital by the issue of $200,000 of 8 per cent. preferred stock.

The Shelby Spring Hinge Company, Shelby, Ohio, has recently acquired the plant of the Van Wagoner Company, Cleveland, which manufactured ball-bearing Spring Hinges, Coat and Hat Hooks, the Van Wagoner holdback steel Screen Door Hinge and other Hardware specialties, together with all patents, patterns, dies and kindred property. The company announces that it will at once begin the production of the Van Wagoner line, in connection with its own Shelby Chief double acting Floor Hinges and Hardware specialties.

The Eaton & Prince Company, 70 to 78 Michigan street, Chicago, Ill., are distributing two interesting little pamphlets relating to hand power elevators and to elevator safety gates, doors, &c. The elevators turned out by this concern are such as to meet many requirements, the claim being made that the winding of the cables from each end of the drum toward the center does away with the tendency of the cage to drag to one side or to bind on the guides. The center lift sheave hand elevator is designed for light work in flats, residences, &c., where the load will not exceed 500 pounds. Special attention is invited to the company's improved self-closing or semiautomatic gates, which, unlike the full-automatic gates, are not moved or disturbed by the passage of the elevator car, but always remain closed until opened by hand, when if the car is at the landing they remain open, being held by a pawl engaging with the teeth in a weight provided for the purpose. As soon as the car leaves the floor the pawl drops back and the gate descends and closes the entrance.

"Estimating" is a subject of never ending interest on the part of those identified with the building business, and anything which will tend to render the methods free from annoying mistakes cannot fail to be appreciated by every one in the trade. In another part of this issue attention is invited to a work treating on the subject indicated and known as "Grinnell's Estimator and Builders' Pocket Companion." It is described as a handbook for contractors, masons, carpenters, painters, and treats on all branches of building, from excavating to finishing. It is issued by the Grinnell Publishing Co., 213C, Law Exchange Building, Buffalo, N. Y. The offer as made by this concern in our advertising columns, is to the effect that if the book is not found satisfactory the purchaser's money will be refunded.

High Grade Wood Turning Lathes are the basis of an announcement presented in our advertising columns this month by the Cordesman-Rechtin Company, Butler street, Cincinnati, Ohio. These lathes embody many interesting features, which have established for them an enviable reputation, and they are used by the government, because, as the company puts it, "they are convenient, substantial and durable machines, capable of the hardest kind of turning at high speed."

A. W. Hight, Station C, Toledo, Ohio, directs attention in another part of this issue to his Union Combination Square, which is of such a nature it is stated that all the combinations are available at the same time, and that any desired number of degrees can be obtained instantly. The notch in the end of the protractor enables its use as a gauge for getting in corners, setting hinges, beveling edges, &c. The tool is handsomely nickeled and is of a nature to be appreciated by carpenters everywhere. Those of our readers who reside in the northwestern section of the country can obtain the square from W. B. Colp, Ballard, Wash.

An interesting catalogue of wood mantels showing a great variety of handsome designs is being distributed among the trade by the Heitland Grate & Mantel Company, Quincy, Ill. All mantels illustrated, regardless of price, are made of thoroughly seasoned kiln dried lumber, and the finish and workmanship are referred to as first-class. In connection with the illustrations is given the number of the design, for convenience in ordering, together with telegraphic code word and brief descriptive particulars. Architects and builders who are interested in goods of this chaarcter can obtain a copy of the work on application.

A handsome catalogue of 32 pages illustrated by halftone engravings, showing many of the fine designs of "Classik" metal ceilings, which it is prepared to furnish, has just been issued by the Berger Mfg. Company, Canton, Ohio. The early pages are devoted to some facts about the Berger ceilings, which consist of 11 styles; also to instructions for taking the measurements of a room which is to be ceiled, and a birdseye view of the company's plant, which is referred to "as the largest sheet metal works in the world." The entire make-up of the catalogue, which is known as "No. 7A," is exceedingly attractive, and it will be found a valuable addition to the architects' and builders' collection of trade literature. Under each design is mentioned its style, its number and the various members of which it is composed.

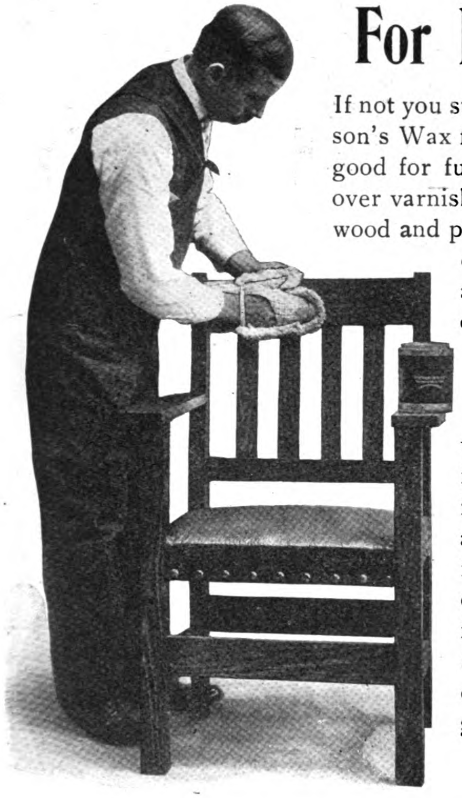
The Hess Warming & Ventilating Company, 909 Tacoma Building, Chicago, Ill., offers free to the readers of *Carpentry and Building* two of Dixon's largest and best carpenters' pencils in return for three or more names of owners or builders who intend purchasing furnaces. In this connection it may be remarked that the company makes the well-known "Leader" steel furnace, which is sold direct to the user under an absolute guarantee. If the purchaser desires he can have all pipes cut to fit and arranged in such a way that any handy man can set up the furnace and put in the pipes. What the company has to say regarding its offer in our advertising pages this month is likely to be of interest. The company has just issued an interesting little work, entitled "Modern Furnace Heating," which gives much valuable information on the subject, and a copy of it will be mailed to any address on application.

Albert Oliver, manager of the fireproofing department of the Clinton Wire Cloth Company, Clinton, Mass., has moved from 150 Nassau street, New York City, to more commodious quarters in the Metropolitan Life Building, 1 Madison avenue, the center of New York's building interests. It is largely due to Mr. Oliver's ability, backed by the excellence of the products which he is handling, that Clinton electrically welded fabric and Clinton wire lath have become two widely used building materials among leading architects, engineers, builders and contractors. The scope of the Clinton products is shown by the following, representing a few of the more important structures in which they have been used throughout: electric power house of the New York Central Railroad at Yonkers, N. Y.; plant of the St. Croix Paper Company, Sprague's Falls, Maine; Hamburger Building, Sonneborn Building, Fish and Produce markets, Baltimore, Md.; City Hall, Newark, N. J.; new plant of the American Can Company, new plant of the Merchants' Refrigerating Company, Hermitage Building, Tichenor-Grand Company's stable, Bliss residence, addition to the Long Acre Hotel, New York: U. S. Naval Coaling Station at Sangley Point, Cavite, P. I.; harbor freight sheds at Montreal; new plant of the Singer Mfg. Company, at St. John's, Quebec; Wells-Fargo Building, Portland, Ore., and the Fairmount Hotel, San Francisco, Cal.

Have You Ever Tried

Johnson's Prepared Wax

For Polishing Furniture?



If not you surely ought to. You are familiar with Johnson's Wax for floors and woodwork. It is equally as good for furniture. You apply the wax with a cloth over varnish, shellac, or any other finish, or to bare wood and polish with Johnson's Polishing Mitt or dry cloth. You immediately obtain a beautiful, artistic and lasting polish to which dirt and dust will not adhere. It will not blister, crack, peel off or show scratches. It is a complete finish and polish.

Johnson's Polishing Mitt is our latest invention. While it is not necessary to use it when polishing furniture and woodwork it is advisable to do so because it saves time and labor and produces the best work. It is made of sheepskin with the wool on; is open across the back and slips on the hand; is far ahead of cloth, brushes or anything for similar use and will last for years. When dirty it may be cleansed with benzine or gasoline

Read FREE Mitt Offer Below.

Always use

Johnson's Prepared Wax

"A Complete Finish and Polish for all Wood"

For Furniture, Woodwork and Floors

with Johnson's Polishing Mitt on Furniture and Woodwork and with Johnson's Weighted Brush on Floors and you will always obtain the best results. Johnson's Wax is far superior to any other—one reason is that it contains the most polishing wax to the pound. Johnson's Prepared Wax is **sold by all dealers in paint**—Universal size 1½ oz. 10 cents; Household size, 4 oz. 25 cents; 1 and 2 lb. cans 60 cents per pound; 4, 5 and 8 lb. cans 50 cents per pound.

Free Mitt Offer Send us name of your paint supply house and we will send you FREE prepaid one Johnson Polishing Mitt. Don't delay—send to-day and ask for a copy of our new 48 page book, "The Proper Treatment for Floors, Woodwork and Furniture." Tells all about finishing wood. You should have a copy of this valuable book. The regular price is 25 cents, but for a limited time we will send FREE for name of paint supply house. Send coupon to-day.

S. C. JOHNSON & SON
Racine, Wis.
"The Wood-Finishing Authorities."

Coupon
C. B. 10
S. C. Johnson & Son,
Racine, Wis.

Gentlemen: My paint dealer's name is
....
....
His address is
....
....
for which please send me **Free** prepaid one Johnson Polishing Mitt and copy of your new book "The Proper Treatment for Floors, Woodwork and Furniture" as per your offer.
My name is ....
....
Address..............................
....

This is our New Ware House

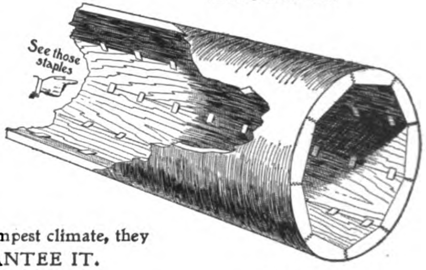
50 x 50 feet, three floors.
Capacity, 7000 columns.

All orders for columns in stock sizes shipped same day as received.

Cut of Staple is three quarter size.

THEY CANNOT OPEN AT THE JOINTS.

Columns are glued up under enormous pressure and then the staples are driven in as shown in illustration by our special machinery.



FREE OFFER On Receipt of Postal saying where you saw this Adv. we will send you postage paid a Sample Section of this Column showing the wonderful Lock Joint.

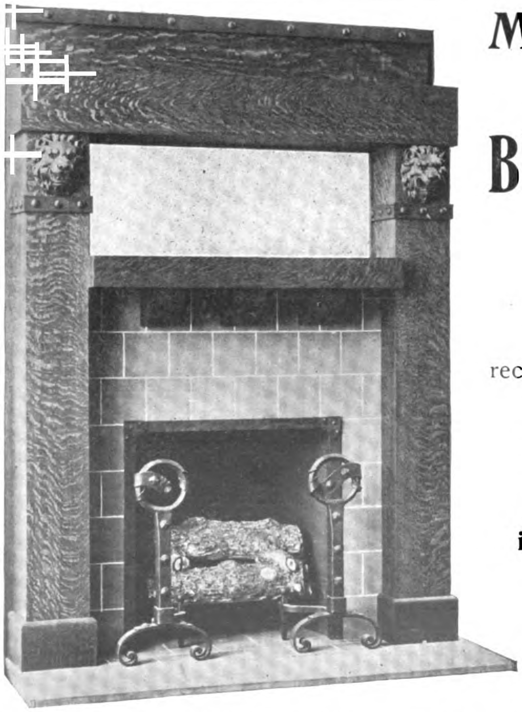
Put them where you will, in the hottest room, the driest or dampest climate, they POSITIVELY WILL NOT OPEN. WE GUARANTEE IT.

Made only by

AMERICAN COLUMN COMPANY, BATTLE CREEK, MICH.

DON'T TAKE SUBSTITUTES.

Patented in United States and Canada.



Mantel Satisfaction

is assured if you buy

BURRITT MANTELS

Because they represent the maximum value at the minimum price.

Here's the proof as shown by letters received from our customers:

"Well pleased."
"Better than I expected."
"Splendid value."
"Will send another order soon," etc., etc.

if YOU need Mantels write TO-DAY for our catalogue.

Mantels in special sizes and woods for special requirements. Write us concerning your needs.

If we can save you money, you want to know it, don't you?

THE A. W. BURRITT CO.
"THE MANTEL FOLKS."

400 KNOWLTON STREET,
BRIDGEPORT, CONN.

Wood Carvings

Hand and Machine Carvings, Mouldings, Festoons, Newel Posts, Head Blocks, Rope and Twist Balusters and Ornaments. We also make a specialty of Fine Staved Up Quartered Oak and Birch Columns for Interior Work.

Almost 1,500 designs illustrated in our New Catalogue and Price-List No. 20. Mailed for 15c. in stamps.

Waddell Mfg. Co.,

Corner Taylor and Coldbrook Sts.,
GRAND RAPIDS, MICH., U. S. A.

No. 0575.

NEW BOOKS
On Concrete Blocks

CONCRETE-BLOCK MANUFACTURE PROCESSES AND MACHINES

By H. H. RICE

152 Pages. 46 Half-tone Cuts

Includes several illustrations of recently built concrete-block houses.

Bound in Cloth
Price, $2.00, Postpaid

THE MANUFACTURE OF

CONCRETE BLOCKS

And Their Use in

Building Construction

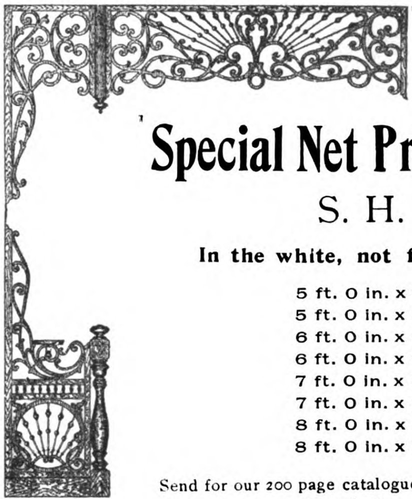
By
H. H. RICE, D. M. TORRANCE
and others

125 Pages. Illustrated

Presents a series of articles submitted in competition for money prizes offered jointly by "Engineering News" and "Cement Age," of New York City.

Bound in Cloth
Price, $1.50, Postpaid

David Williams Company
14-16 Park Place, New York



Special Net Prices on Grilles

S. H. 1072½

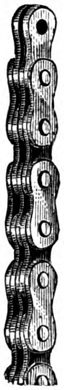
In the white, not filled and varnished.

5 ft. 0 in. x 8 in.,	$9.60
5 ft. 0 in. x 9 in.,	10.00
6 ft. 0 in. x 8 in.,	10.80
6 ft. 0 in. x 9 in.,	11.25
7 ft. 0 in. x 8 in.,	12.00
7 ft. 0 in. x 9 in.,	12.75
8 ft. 0 in. x 8 in.,	13.20
8 ft. 0 in. x 9 in.,	13.75

Send for our 200 page catalogue showing a large assortment of millwork for prompt delivery.

Schaller-Hoerr Company

416-426 Blue Island Ave., Chicago, Ill.



THOMAS MORTON,

169 Elm Street, New York.

Copper Cable, Champion Metal,
Steel Cable, Steel Champion,

SASH CHAINS.

CHAINS

For Suspending Heavy Doors, Gates, etc.
All of SUPERIOR QUALITY.

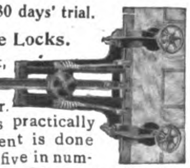
Miller's Hand Mortiser

PRICE $12.00. $4.00 with order, balance after 30 days' trial.

Its Work is to Make Openings in Doors for Mortise Locks.

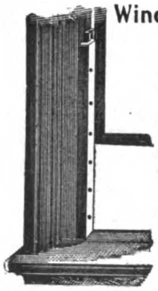
The time is Three Minutes. The Material is Hard, Soft, Cross Grained and End Wood.

The job is Clean, True and Parallel with Sides of Door. The Labor is Performed with slight exertion. The care is practically none, as the tool does not get out of order. The adjustment is done in a moment's time for the different sizes. The cutters are five in number, and cover locks from 1 2 to 1 1-8 inches thick. Thin Doors are handled as easily as Thick Doors.



Riverside, Cal **A. W. MILLER MFG. CO.** Cincinnati, O

King's Automatic Weather Strip.



Window and Door Stop.

The only perfectly satisfactory weather strip, window and door stop on the market.

Keeps out cold and dust.

Makes a perfectly tight joint.

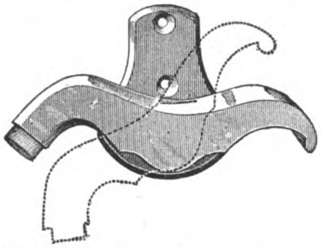
Windows can be raised and lowered to desired position without the use of fasteners or of weights.

Do not build a house until you have investigated the merits of these strips.

Write for prices.

MANUFACTURED BY
The King Manufacturing Co.
Newton, Ia.

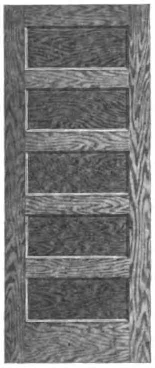
EMPIRE DOOR HOLDER
IMPROVED



Holds the heaviest doors on polished floors. 50% greater pressure than any other. Easy to put on, easy to use; the toe operates it. Write for circulars to

CALDWELL MFG. CO.,
5 Jones Street, Rochester, N. Y.

50% SAVED
OAK VENEERED DOORS IN STOCK ALL SIZES.



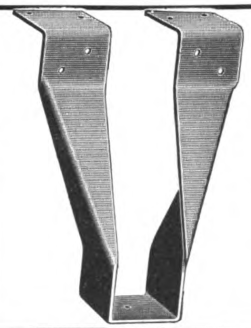
MADE IN STOCK QUANTITIES, SOLD AT STOCK PRICES, CARRIED IN STOCK

THE FOSTER-MUNGER CO.
AMERICAS GREATEST SASH & DOOR HOUSE
CHICAGO, U·S·A·
WRITE FOR VENEERED DOOR BOOK 1448 A

Forest City Bit & Tool Co., Rockford, Ill., U.S.A

Manufacturers of Wood Boring Bits, Hollow Mortising Chisels, Common Mortising Chisels and Tools
Send for CATALOG "G" Send for

— TWO EXCEPTIONS.—"They say that all the world loves a lover," said the rejected suitor, as he ate his dinner from the mantlepiece. "But there are generally two exceptions to the rule—the girl you want to be your wife and the man you want to be your father-in-law."—*Princeton Tiger.*



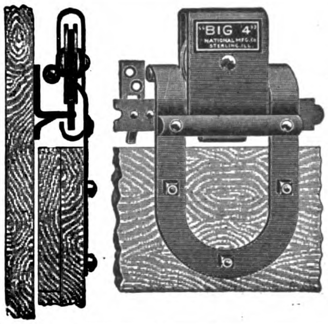
ASK YOUR DEALER FOR

Lane Bros. Co.
JOIST AND TIMBER HANGERS.

Made in more than one hundred listed sizes.
Any special size or modification to order.

Manufactured by

Lane Bros. Co.,
(THE DOOR HANGER MFRS.)
423-455 Prospect St , POUGHKEEPSIE, N. Y.



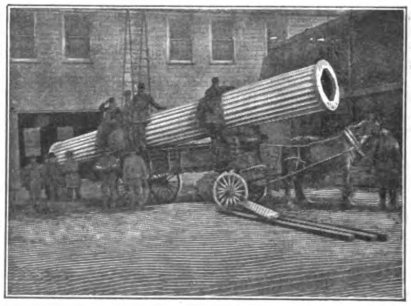
"BIG 4" FLEXIBLE DOOR HANGER.

Anti-Friction. Cannot Jump the Track.
Exclusive Sale Given.

NATIONAL MFG. CO.,
STERLING, ILL.

Grand Rapids Wood Carving Co.,
GRAND RAPIDS, MICH.

Catalogue on application.



THE LARGEST LOCK JOINT COLUMN EVER BUILT.

40½" in diameter, 33-10 in. long.

One of four furnished by us for the Portico of the Allenhurst Club, Allenhurst, N. J.

HARTMANN BROS. MFG. CO.
Mt. Vernon, N. Y., U. S. A.
New York Office: 1123 Broadway.
Also
Henry Sanders Co., Chicago, Ill.
A. J. Koll Planing Mill Co.,
Los Angeles, Cal.

MANUFACTURERS OF
KOLL'S PATENT LOCK JOINT COLUMNS FOR PERGOLAS, PORCHES OR INTERIOR USE.
Send for Catalogue D 19.

GRILLES "Direct from Factory" MANTELS

No. 225—48x12 inches, **$3.60.** Retail value, $7.00.
No. 230—48x14 inches, with Curtain Pole, **$4.50.** Retail value, $9.00.
Others from $2.50 up. Largest assortment. Division Screens and special Grilles to order.

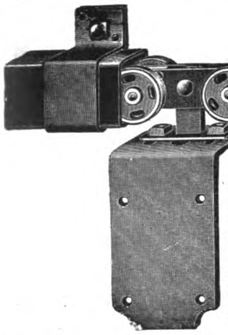
Tile and Mosaics
for everywhere.
Walls, Floors, etc.

$13.25 buys this solid oak Mantel, 80 in. high, 51 or 60 inches wide, 28 x 16 Mirror. Heavy columns and elaborate capitals. Tile facing and hearth with Plated Frame and Club House Grate, $10. extra.

HARDWOOD FLOORS
will last as long as the house. Any carpenter can lay it easier than ordinary flooring. Get our prices.

Write for catalog of Mantels, Grates, Tiles for floors and baths, Slate Laundry Tubs, Grilles, etc. It is free. Or send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from **$12 to $200.**

W. H. OSTENDORF, - - - - - - - 2923 N. Broad St., Philadelphia, Pa



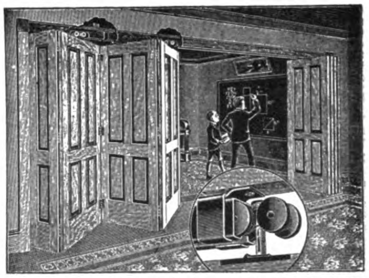
No. 20 Standard Trolley Roller-Bearing Barn Door Hanger

RICHARDS
DOOR HANGERS
are the best.

Made for sliding doors of all sizes and weights.

Popular with architects and builders.

Sold by dealers.



No. 135 Ball-Bearing Swivel Door Hanger for folding doors. Vertical Adjustment.

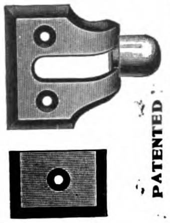
The Richards Mfg. Co., Aurora, Ill.
New York Office, 101 Reade St.
Send for Catalogue of Door Hangers, Fire Door Fixtures, Conveying Systems.

SPECIAL OFFER TO CARPENTERS
BUILDERS AND OWNERS OF HOMES

Ives Patent Window Ventilating Lock, a Safe-Guard for Ventilating Rooms, Pure Air, Good Health and Rest Assured.

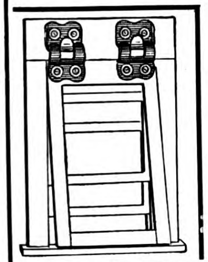
To introduce this article, Four Ventilating Locks in genuine Bronze, Brass or Antique Copper Finish will be mailed to any address prepaid for One Dollar. Will include a forty page Hardware Catalogue and Working Model to Carpenters who wish the agency to canvass for its sale. Address

THE H. B. IVES CO. NEW HAVEN. Conn., U. S. A.



YOU CAN MAKE AND SELL MORE

STORM WINDOWS
if you hang them with
GOSSETT DETACHABLE SUSPENSION HINGES



Your customers will be better pleased. Storm sash so attached can be opened for ventilation. Put up, taken down or replaced with screens without the use of ladder or tool. Sample pair free if you mention this paper. Sold by dealers in Hardware and Building Material.

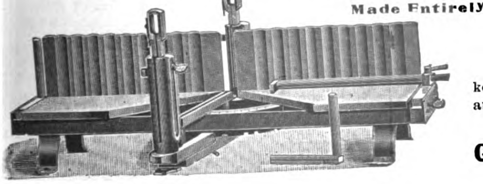
F. D. KEES MFG. CO., Beatrice, Nebr.

LATEST DESIGNS IN
Builders' Hardware

Our new Catalogue sent Free to Contractors and Material Men upon request.

REHM HARDWARE COMPANY
354 Blue Island Ave., Chicago

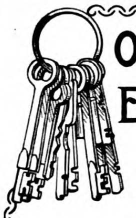
GOODELL MITRE BOX
Made Entirely **OF STEEL.**
No More Breaking.



Most desirable Box on the market, being way ahead in quality and improvements.

Send for Folder.

GOODELL MFG. CO.
GREENFIELD MASS.



ONE KEY ENOUGH

Did you ever see a man pull out a bunch of keys as big as your fist and try a half dozen which looked alike before he found the proper key? A Yale Master-key Locking System makes one little key open a dozen or a thousand locks of many sizes and uses. The business man may carry one key that will pass every lock in his residence, stable, factory, office, and country place. His wife will have a sub-master key that will open every lock in the home; the superintendent, one that will open any lock in the factory, etc., while each lock has its individual key which will unlock it and no other.

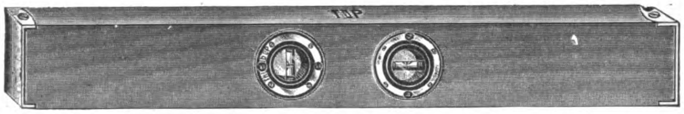
THE YALE DUPLEX Master-Key System

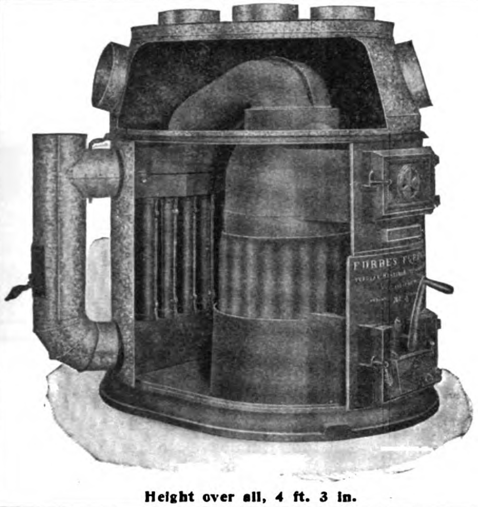
gives all this convenience without reducing the number of key changes and thus lessening the security.

Residences so equipped amply repay in satisfaction the slight additional cost. For factory buildings and public institutions, such as city buildings, school houses, and charitable institutions, the actual savings effected in time, money, tools and supplies is sufficient to return in a very short time the cost of the master-key locking system.

Write for folders explaining the Yale Master-key Locking System, and "The Key to a Good Thing," which shows how a Yale Lock Works.

THE YALE & TOWNE MFG. CO.
9-15 MURRAY STREET,
NEW YORK


TOP



Height over all, 4 ft. 3 in.

THE FORBES FURNACE

Burns Either Hard or Soft Coal

EVERY ONE GUARANTEED
IF PROPERLY INSTALLED

No Sheet Iron Drums—Entirely Cast Iron
—Radiating Drums 1-8 Inch Thick,
Will Wear for Years

YOU RUN NO RISK IN PUTTING IN THE FORBES FURNACE

SEND FOR CATALOG AND FULL PARTICULARS

Tubular Heating & Ventilating Co.
228 Quarry St., Philadelphia

Useful Pamphlets

At 25 Cents Each

POSTPAID

Practical Hints on Joint Wiping.
For Beginners in Plumbing. Sixth Edition, enlarged, 66 pages, 41 illustrations. 5½ x 8 inches .25

House Chimneys.
A Series of Articles and Letters on Chimney Troubles and their Remedies. 62 pages, 40 illustrations. 5½ x 8 inches .25

Domestic Electrical Work.
Concise and Practical Explanations on Wiring Buildings for Bells, Alarms, Annunciators and for Gas Lighting from Batteries. By W. A. WITTBECKER. 55 pages, illustrated. 5½ x 8 inches .25

Leading Architects' Drawings.
Practical Suggestions for young Mechanics. 29 pages, illustrated. 5½ x 8 inches .25

Guide to Bronzing and Enamelling.
Treating Liquids, Enamel Paints, etc. 37 pages. 5½ x 7 inches .25

The Preparation and Use of Cements, Glue and Paste. 177 receipts. 58 pages. 5 x 7¼ inches .25

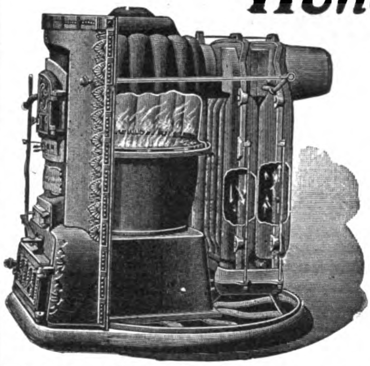
How to Become a Good Mechanic.
A Practical Guide to Self-Taught Men; Telling what to Study; How to Begin; What Difficulties will be Met and How to Overcome Them, &c. 68 pages. 5 x 7 inches .25

Easy Lessons in Roof Measurements.
Twelve Short Lessons in Figuring from Architects' or Scale Drawings, the Amount of Material Required to Cover a Given Surface in Flat, Hipped or Irregular Shaped Roofs. 31 pages, 12 illustrations. 5½ x 8 inches .25

Blue Print Making.
Embracing Directions for Constructing the Printing Frame, Preparing the Paper, and Making Prints of Various Kinds. 28 pages. 5½ x 8 inches 25

David Williams Company
PUBLISHERS
14-16 Park Place.
NEW YORK.

Honest Value!



Nothing Light Weight or Frail about the

Bengal Furnace

It's heavy—but well proportioned, and the weight placed where it will give big heating capacity and great durability.

When properly installed you can depend on plenty of pure warm air,—and small coal bills.

Burns hard or soft coal.

If you are looking for an honest Furnace—one you can depend upon—ask for our proposition.

DO IT NOW!

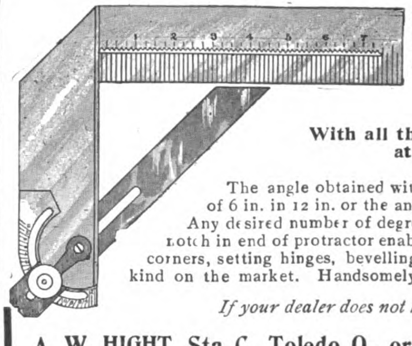
THE FLOYD WELLS CO., Manufacturers, Royersford, Pa.

The Carpenter and Builder who *insists* that the local dealer furnish heating apparatus marked "made by the

INTERNATIONAL HEATER CO.,"

will never be in hot water himself. This "F" series HOT WATER HEATER invariably gives satisfaction.

UTICA, N. Y.
New York. Boston. Chicago.



PATENT APPLIED FOR

HIGHT'S UNION COMBINATION SQUARE

With all the Combinations Available at the Same Time

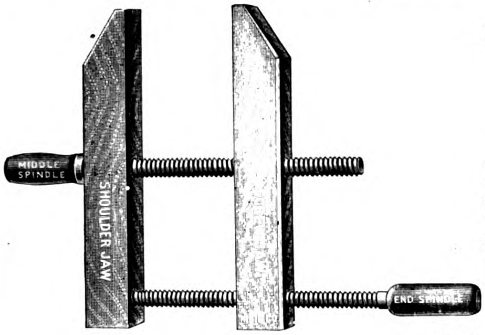
The angle obtained with its use is one that will give a rise of 6 in. in 12 in. or the angle for bottom of rafter for ¼ pitch. Any desired number of degrees can be obtained instantly. The notch in end of protractor enables its use as a gauge for getting in corners, setting hinges, bevelling edges, etc. The best tool of its kind on the market. Handsomely nickeled.

If your dealer does not have them send $1.00 to

A. W. HIGHT, Sta. C., Toledo, O., or W. B. Colp, Ballard, Wash.

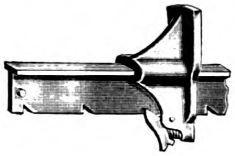
A COMPLETE LINE

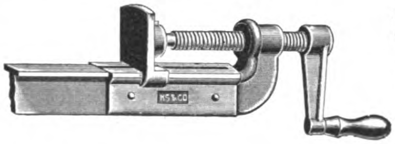
OF HAND SCREWS, CLAMPS, ETC.

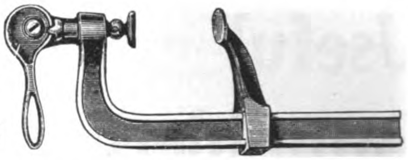


Described in our Catalogue No. 2009. We also have a Special Catalogue No. 2010 of the "Colt's Quick Acting Clamps." Send for copies of both.

If you are interested in Saws and Planes, you should have our Catalogue No. 2011 of the former, and No. 2012 of the latter. Both complete in every way.







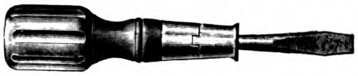
HAMMACHER, SCHLEMMER & CO.

Hardware, Tools and Supplies

4th Ave. and 13th St. NEW YORK, SINCE 1848 **(Block South of Union Square)**

TOWER'S CHAMPION SCREW DRIVERS

FOR SIXTEEN YEARS THE ACKNOWLEDGED STANDARD.



Every Blade Is Tested to Split a Screw Head.

AVOID Imitations of CHAMPION Screw Drivers. None Genuine without the name "CHAMPION" which is our Trade Mark and Guarantee.

TOWER & LYON CO.

95 Chambers Street, New York.

"Forstner" Brace and Machine Bits

For Fine Carpenter, Cabinet and Pattern Work

Specially Adapted for Hardwood Working.

The Forstner Labor-Saving Auger Bit, unlike other bits is guided by its *Circular Rim* instead of its centre; consequently it will bore any arc of a circle and can be guided in any direction regardless of grain or knots, leaving a true polished surface. It is preferable and more expeditious than chisel, gouge, scroll-saw, or lathe tool combined, for core-boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon moulding and mortising, etc.

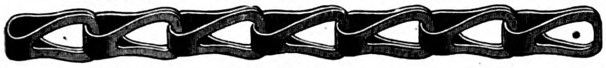
To introduce this high grade tool among carpenters, pattern makers, and others, we will mail to any reader of "Carpentry and Building," upon receipt of 50c. any bit we make from ¼ inch to 1 inch in size.

Manufactured by

The Progressive Mfg. Co., Dept. "A", Torrington, Conn.

Enquire of your Hardware Dealers or write us direct. Supplied in Sets. Write for Catalogue.

SASH CHAIN



CABLE CHAIN

JACK CHAIN

The SMITH & EGGE MFG. CO.

Bridgeport, Conn.

Manufacturers of "**Giant Metal**" **Sash Chains**
" " "**Red Metal**" " "

Cable Chains, Jack Chain, Bell Hangers' Chains and Plumbers' Chains
Made in Brass, Copper and Steel

WRITE FOR CATALOGUES AND PRICES

We are the ORIGINATORS of SASH CHAIN as a SUBSTITUTE for sash cord

CLAMPS

HARGRAVE'S
TOOLS

BEST QUALITY FINISH DESIGN

Specify these goods to your dealer. **TAKE NO OTHER.** Write for Catalogue No. 200.

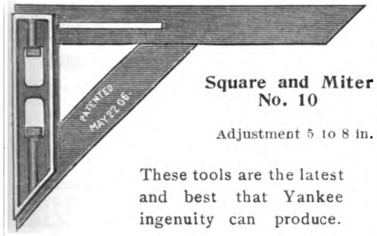
The Cincinnati Tool Co.,
Norwood. Cincinnati, O.

THE AKRON ECLIPSE LEVELS

Manufactured by **The BAKER McMILLEN CO.**
AKRON, OHIO.

We have a proposition that will interest every carpenter. Drop us a postal and we will send it to you.

The Fox Tools

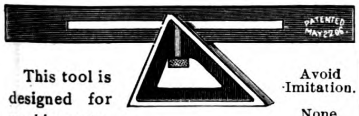


Square and Miter No. 10

Adjustment 5 to 8 in.

These tools are the latest and best that Yankee ingenuity can produce.

Octagon and Miter No. 12



This tool is designed for marking octagons and miter sliding blade will allow of long or short cut.

Avoid Imitation.

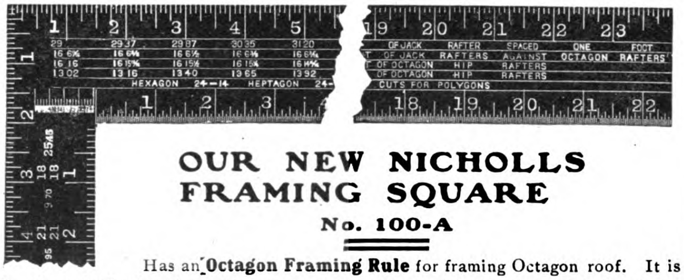
None genuine without sliding blade.

The Gem Square and Miter No. 11

Try, miter and gauge square; adjustment 4½ to 8½ inches.

P. L. FOX
Patentee and
Sole Manufacturer of
Fox's Tools
432 WILLIAM ST.
BRIDGEPORT, CONN.

If your dealer won't furnish them write me.

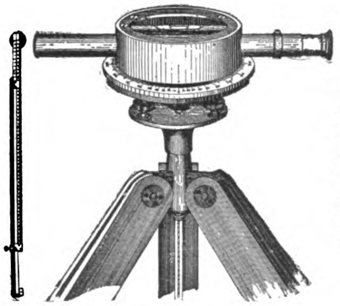


OUR NEW NICHOLLS FRAMING SQUARE

No. 100-A

Has an **Octagon Framing Rule** for framing Octagon roof. It is found on the back of body of square, and on face of body of square is found our **Common Framing Rule.**

NICHOLLS MFG. CO., Ottumwa, Iowa



WHAT BUILDERS HAVE BEEN LOOKING FOR

BOSTROM'S
Improved Builders' Level

An absolutely reliable leveling instrument for Architects. Builders, Carpenters, and Stone Masons. Can be used for any kind of foundation work and getting angles, is simple in its construction, easily understood, and can be operated by any one. Is made of Brass, oxidized, and has a silvered circle of degrees. Has achromatic Telescope of ample power for such work. Price, including Plumb Bob, Tripod and Graduated Rod and Target, $25.00. Write for circular and be convinced. Every instrument guaranteed.

BOSTROM-BRADY M'F'G CO.,
53½ West Alabama Street,
Atlanta, Ga.

Bostrom-Brady Mfg. Co,
Atlanta, Ga.

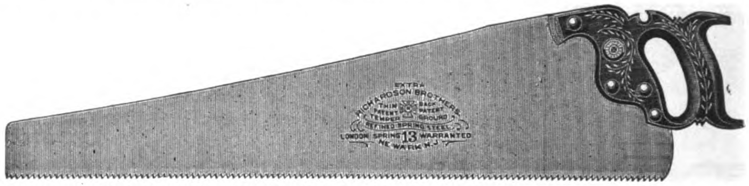
Mt. Vernon, Ind.
June 19, 1906.

Gentlemen:

Having purchased one of your Builders' Levels last January, I am pleased to say that it is all you claim for it and do heartily recommend it to the Builder and Contractor for leveling foundations and setting stone piers. I have used it on several jobs: The residence of A. J. Grobert; a couple of school buildings and on the Ice & Cold Storage job—a fair sized job—amounting to $25,000, and it proved to be all right.

Respectfully yours,
ED. STALLMAN.

OLD RELIABLE RICHARDSON SAWS.



ESTABLISHED 1860.

The peer of them all. Try one and be convinced. Every saw fully warranted.

NATIONAL SAW CO. Operating Richardson Bros. **NEWARK, N. J.**

Quality Tells

WHEN HENRY DISSTON WAS ASKED THE QUESTION: "WHAT DO YOU PUT IN YOUR SAWS?" HE REPLIED: "GOOD STEEL AND HONEST WORK."

UPON THIS FOUNDATION IS BUILT DISSTON QUALITY.

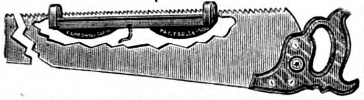
"If you want a saw it is best to get one with a name on it that has a reputation. A man has made a reputation for his goods knows its value as well as its cost and will maintain it"

ESTABLISHED
1840

HENRY DISSTON & SONS, Inc.
PHILADELPHIA, PA.

C. C. C. SAW CLAMP

Always ready. Easy to Adjust. Never out of order Up to date.



Pat. U. S. and Canada 1906. Other Patents Pending. Can be placed on the edge of bench timber, board or almost anywhere; takes but little room in box; weight, about 1 lb. No carpenter can afford to be without it. **PRICE, 75c.** If your dealer cannot furnish it we will mail postpaid on receipt of price.

C. W. CARDWELL MFG. CO., - - JAMAICA, N. Y.

When you buy

ECCENTRIC CLAMPS

specify

COLT'S

There is a difference—let us tell you

Ask for catalogue No. 129.

BATAVIA CLAMP CO.,
23 Center Street, BATAVIA, N. Y.

FURNACE HEATING.

By William G. Snow

With an Appendix on Furnace Fittings.

170 Pages; 90 Illustrations; Size, 6 x 9 inches. Cloth bound. Price, $1.50.

DAVID WILLIAMS CO.
14-16 Park Place, - New York

They Both Hold the Same Position

In the confidence and esteem of an appreciative public.

And no matter whether it be in North America, South America, Europe, Asia, Africa or Australia, mechanics everywhere turn to our books.

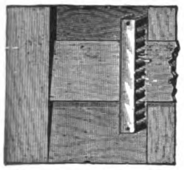
← The carpenter and woodworker to this book.

Whenever they wish to post themselves or to find out where they can get tools, machinery and supplies in their respective lines. We shall be proud to send either book to anybody in any place on receipt of 25c.

The metalworker and machinist to this book →

The Chas. A. Strelinger Co.,

Box B. DETROIT, MICH., U. S. A.



NEW
CLAP-BOARD MARKER.
Cheaper and better than any on the market.

Countersink and Depth Gauge.

Send for circulars, or ask your Hardware Dealer for them.

OTIS A. SMITH, Rockfall, Conn.

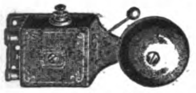
"THROUGH FRISCO'S FURNACE" EDITION DE LUXE

Illustrations of seven modern steel frame buildings at San Francisco, that withstood the earthquakes and fire of April 18th, 1906, with reports on the rust resisting qualities of Dixon's Silica-Graphite Paint on the steelwork.

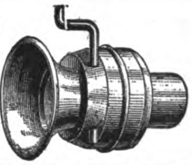
WRITE FOR A FREE COPY OF BOOK NO. B-32.

JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, U. S. A.

W. R. OSTRANDER & CO., 22 Dey Street, New York City,



Manufacturers of
Speaking Tubes, Whistles, Elevator,
House and Hotel Annunciators and Bells,
Electric Light Supplies.
Send for Catalogue.

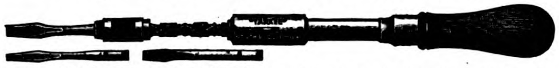


Factory, 1431-1439 DeKalb Avenue, Brooklyn.

"Yankee" Tools.

No. 11.—RATCHET, RIGHT AND LEFT HAND AND RIGID.

No 15—RATCHET, WITH FINGER TURN ON BLADE.



No. 30.—SPIRAL RATCHET, RIGHT AND LEFT HAND AND RIGID.

The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up to date mechanic could buy tools of their quality and character. Other tools are very good tools, but "Yankee" Tools are better. "Yankee" Tools are sold by all leading dealers in Tools and Hardware. Ask your dealer to see them. Our Yankee Tool Book tells all about them. Sent free by

NORTH BROS. MFG. CO., Philadelphia, Pa.

A TOOL THAT'S STAMPED
STANLEY
IS THE BEST OF IT'S KIND

IMPROVED CARPENTERS' TOOLS

Sold by all Hardware Dealers

Stanley Rule and Level Co.
NEW BRITAIN, CONN., U. S. A.

A COMPLETE FRAMING RULE
ON
Nicholls Framing Square.

On the square is where the carpenter wants his figures, not in a book or on a piece of paper, as they are usually lost.

NICHOLLS MFG. CO.,
OTTUMWA, IOWA.

Catalogue No. 19
WOOD WORKERS TOOLS
WM. P. WALTER'S SONS
1233 Market Street
Philadelphia

We have now ready our
New Illustrated Catalogue No. 19
devoted exclusively to

Wood Workers' Tools

Containing **250** pages, **1100** illustrations, handsomely printed on good paper, it makes a convenient and valuable book for **all woodworking mechanics.**

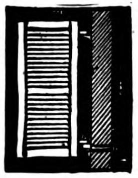
Sent to any address on receipt of 10 cents postage.

WM. P. WALTER'S SONS,
TOOL HEADQUARTERS
1233 Market St., Philadelphia.

Mallory Shutter Worker.

Works and locks the blinds from the inside. Ornamental, durable, perfect working. Applicable to old or new buildings.

Manufactured by
MALLORY MFG. CO.,
Flemington, N. J.



Use Our
Folding and Adjustable
Handle Draw Knife !

It is adjustable to any position, adaptable to the awkward places, absolutely rigid when set, handy and compact, a time saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

Write for Prices and Discounts.

A. J. WILKINSON & CO.,
180-188 Washington St., Boston, Mass., U.S.A

The Rich Handy Drawing Outfit
Saves Time

for the draughtsman and is a great aid to the learner. It holds a number of sheets or a pad, which requires no fastenings. The Protractor T Square gives accurate angles. You get measurements direct from the board. Has a drawer for instruments, and can be carried around to make drawings on the spot. Circulars free.

J. & G. RICH, 122 N. 6th St., Phila, Pa.

GRINDSTONES

Mounted
Grindstones
for
Carpenters'
or Anybody's
Use.

THE CLEVELAND STONE CO.
6th Floor, Hickox Bldg., CLEVELAND, O.

Alphabetical List of Advertisers.

American Column Co.	59
American Rolling Mill Co.	14
American School of Correspondence	9
American Wood Working Machinery Co.	6
Asphalt Ready Roofing Co.	1
Baker McMillen Co.	65
Barnes, W. F. & John Co.	4
Barnes Tool Co.	9
Barnett, G. & H., Co.	1
Batavia Clamp Co.	66
Berger Mfg. Co.	14
Bommer Bros.	1
Boston Bolt Co.	14
Bostrom-Brady Mfg. Co.	65
Boynton Furnace Co.	16
Bridgeport Chain Co.	68
Burlington Venetian Blind Co.	68
Burritt, A. W. Co.	59
Cabot, Samuel	1
Caldwell Mfg. Co.	61
Canton Mfg. Co.	8
Canton Steel Roofing Co.	18
Cardwell, C. W. Mfg. Co	66
Chattanooga Roofing & Fdy. Co.	51
Chicago Machinery Exchange	6
Cincinnati Tool Co.	65
Cleveland Stone Co.	67
Coldwater Specialty Mfg. Co.	60
Columbia Mineral Wool Co.	16
Comstock, Wm. T.	68
Cordesman, Meyer & Co.	8
Cordesman-Rechtin Co.	7
Cortright Metal Rfg. Co.	11
Crescent Machine Co.	7
Danforth, A. H.	15
Davis & Cook	62
Diamond Expansion Bolt Co	15
Dieckman, F.	13
Disston, Henry & Sons	66
Dixon, Jos., Crucible Co.	67
Drouve, G. Co.	13
Eastern Granite Roofing Co	12
Edwards Mfg. Co.	11
Eller. Mfg. Co.	12
Engineers Equipment Co	51
Fay, J. A. & Egan Co.	5
Floyd, Wells Co.	63
Ford Auger Bit Co.	68
Forest City Bit & Tool Co.	61
Foster Munger Co	61
Fox Machine Co.	8
Fox, P. L.	65
French, Samuel H. & Co.	15
Frink, I. P.	68
Gage Tool Co.	16
Globe Ventilator Co.	15
Goodell Mfg. Co.	51
Grammes, L. F., & Sons	63
Grand Rapids Hdw. Co.	8
Grand Rapids Wood Carving Co.	61
Hammacher, Schlemmer & Co.	64
Hartmann Bros. Mfg. Co.	61
Hess Warming & Ventilating Co.	63
Hitchings Co.	51
Howes, S. M., Co.	68
Hurley Machine Co.	3
Interior Hardwood Co.	1
International Cor. Schools	7
International Heater Co.	68
Ives, Hobart B. & Co.	62
Jennings, C. E. Co.	68
Johnson, E. J., Co	12
Johnson, S. C., & Son	58
Kanneberg Rfg. & Ceil. Co.	15
Karol, B. C.	6
Kees, F. D. Mfg. Co.	62
Keighley, S. Metal Ceiling & Mfg. Co.	18
Kidder, R. E.	18
Kimball Bros. Co.	14
King Mfg. Co.	61
Kinnear & Gager Co.	14
Lane Bros. Co.	61
Lestershire Lumber & Box Co	15
Long Island Machinery Co.	9
Mallory Mfg. Co.	67
Marston, J. M. & Co.	5
Mesker & Bro.	18
Meyers, F. J. Mfg. Co.	6
Miller, A. W., Mfg. Co.	60
Millers Falls Co.	68
Montross Metal Shingle Co.	14
Morse, Williams & Co.	15
Morton, Thomas	60
Mullins, W. H. Co.	11
National Mfg. Co.	61
National Roofing Co.	8
National Saw Co.	66
Nat'l Sheet Metal Rfg. Co.	15
New Jersey Zinc Co.	12
N. Y. Steel Corner Plate Co.	62
Nicholls Mfg. Co.	65&67
North Bros. Mfg. Co.	67
Ostendorf, W. H.	61
Ostrander, W. R. & Co.	67
Parks Ball Bearing Machinery Co.	5
Pettyjohn Co.	8
Phila. & Boston Face Brick Co.	16
Pike Mfg. Co.	1
Progressive Mfg. Co.	64
Reed & Auerbacher Co.	16
Rich, J. & G.	67
Richards Mfg. Co.	62
Sackmann, F. A.	15
Samson Cordage Works	68
Schafer Furnace Co.	68
Schaller Hoerr Co.	60
Sedgwick Mch. Works	14
Seneca Falls Mfg. Co.	4
Shimer, Samuel J. & Sons	7
Silver Lake Co.	68
Simonds Mfg. Co.	16
Smith, Otis A.	67
Smith & Egge Mfg. Co.	65
Standard Paint Co.	10
Stanley Rule & Level Co.	67
Stanley Works	1
Star Encaustic Tile Co.	11
Starrett, L. S. Co.	1&68
Stowell Mfg. Co.	10
Strelinger, C. A. Co.	66
Taintor Mfg. Co.	68
Topp, G. A. & Co.	10
Tower & Lyon Co.	64
Tubular Heating & Ventilating Co.	68
U. S. Mineral Wool Co.	16
Van Dorn Iron Wks. Co.	5
Waddell Mfg. Co.	60
Walters, Wm. P. Sons	67
Warner Elevator Mfg. Co.	14
Washburne, E. G. & Co.	14
Wheeling Corrugating Co.	10
White, Van Glahn & Co.	68
Wilkinson, A. J. & Co.	67
Willis Mfg. Co.	11
Wood-Mosaic Flooring Co.	16
Yale & Towne Mfg. Co.	62

Classified List of Advertisers.

Annunciators
Ostrander, W. R. & Co.

Architects' Blue Prints

Architects' Details
Lestershire Lumber & Box Co.

Asbestos
Stowell Mfg. Co.

Auger Bits
Ford Auger Bit Co.
Jennings, C. E. Co.

Awnings
Chattanooga Roofing & Fdry. Co.

Band Saws
American Wood Working Machinery Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Crescent Machine Co.
Fay, J. A. & Egan Co.

Blackboards, Slate
Johnson, E. J. Co.

Blinds
Burlington Venetian Blind Co.
Foster-Munger Co.
Schaller-Hoerr Co.

Blind Hinges
Stanley Works

Bolts and Nuts
Boston Bolt Co.

Books
Arthur, Wm.
Comstock, Wm. T.
Williams, David, Co.

Boring Machines
Fox Machine Co.
Millers Falls Co.

Brackets, Building, Folding
Danforth, A. H.

Builders' Hardware
Boston Bolt Co.
Hammacher, Schlemmer & Co.
Yale & Towne Mfg. Co.

Building Brackets, Folding
Danforth, A. H.
Stanley Works
Tower & Lyon Co.

Building Material
Lestershire Lumber & Box Co.

Building Paper and Felt
Cabot, Samuel.
Standard Paint Co.

Builders' Supplies
Schaller-Hoerr Co.

Butts and Hinges
Stanley Works.

Capitals
Grand Rapids Wood Carving Co.
Waddell Mfg. Co.

Ceiling, Metallic
Berger Mfg. Co.
Canton Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Keighley, S. Metal Ceiling & Mfg. Co.
Kinnear & Gager Co.
Wheeling Corrugating Co.
Willis Mfg. Co.

Cement
French, S. H. & Co.

Clamps
Batavia Clamp Co.
Cincinnati Tool Co.

Concrete Block Machines
Pettyjohn Co.

Conductor Pipe and Elbows
Canton Mfg. Co.
Dieckmann, F.

Conductor Pipes
American Rolling Mill.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.

Conductor Shoes
Dieckmann, F.

Contractors' Supplies
Boston Bolt Co.

Cornices, Sheet Metal
Berger Mfg. Co.
Canton Mfg. Co.
Chattanooga Roofing & Foundry Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mesker & Bro.
Mullins, W. H. Co.
Willis Mfg. Co.

Cresting
Van Dorn Iron Works Co.
Willis Mfg. Co.

Cutter Heads
Shimer, Sam'l J. & Sons.

Designs and Details
(See House Plans)

Door Checks and Springs
Hammacher, Schlemmer & Co.

Door Checks, Screen
Caldwell Mfg. Co.

Door Hangers
Lane Bros. Co.
National Mfg. Co.

Draftsmanship
Engineers Equipment Co.

Draw Knives
Wilkinson, A. J. & Co.

Drawing Instruction
International Correspondence Schools.

Drawing Outfits
Comstock, Wm. T.
Rich, J. & G.

Drying Stoves
Drouve, G. Co.
Howes, S. M. Co.

Dumb Waiter Fixtures
Hammacher, Schlemmer & Co.

Eave Troughs
Chattanooga Roofing & Fdry. Co.
Eller Mfg. Co.
Wheeling Corrugating Co.

Elevators and Dumb Waiters
Kimball Bros. Co.
Meyers, F. J. Mfg. Co.
Morse, Williams & Co.
Sedgwick Machine Works.
Warner Elevator Mfg. Co.

Etching Fluid
Reed & Auerbacher Co.

Expansion Bolts
Boston Bolt Co.
Diamond Expansion Bolt Co.

Files and Rasps
Barnet, G. & H. Co.
Boston Bolt Co.

Floor Scrapers
Hurley Machine Co.

Framing Tools
Topp, G. A., & Co.

Furnaces and Heaters
Boynton Furnace Co.
Floyd-Wells Co.
Hess Warming & Ventilating Co.
International Heater Co.
Schafer Furnace Co.
Tubular Heating & Ventilating Co.

Gas and Electric Fixtures
Frink, I. P.

Grates, Fancy Plated
Chattanooga Roofing & Fdry. Co.

Greenhouses
Hitchings & Co.

Grille Work, Wood
Foster-Munger Co.
Waddell Mfg. Co.

Grindstones
Cleveland Stone Co.
Richards Mfg. Co.

Grooving Heads
Fox Machine Co.

Hangers, Barn Door
Richards Mfg. Co.

Hangers, House Door
Richards Mfg. Co.

Hardware Jobbers
White, Van Glahn & Co.

Hardware Specialties
Richards Mfg. Co.

Heaters.—*Steam and Hot Water.*
International Heater Co.

Hinges, Spring
Bommer Bros.

Hinges, Window Screen
Kees, F. D. Mfg. Co.

House Plans
Comstock, Wm. T.

Iron House Fronts
Mesker & Bro.

Iron Work
Van Dorn Iron Works Co.

Lath, Metal
Wheeling Corrugating Co.

Levels
Baker, McMillen Co.
Bostrom-Brady Mfg. Co.
Davis & Cook.

Lightning Rods
Washburn, E. G. & Co.

Locks
Yale & Towne Mfg. Co.

Lumber and Shingles
Lestershire Lumber & Box Co.

Mantels
Burritt, A. W., Co.
Foster-Munger Co.
French, Sam'l H. & Co.
Ostendorf, W. H.
Phila. & Boston Face Brick Co.

Masons' Sto
Drouve, G.

Mill Work
Schaller-Hoerr Co.

Mineral Wool
Columbia Mineral Wool Co.
U. S. Mineral Wool Co.

Miter Boxes
Goodell Mfg. Co.
Nicholls Mfg. Co.

Miter Machines
Fox Machine Co.

Miters
Fox, P. L.

Moldings
American Column Co.
Grand Rapids Wood Carving Co.
Schaller-Hoerr Co.
Waddell Mfg. Co.

Mortar Colors
French, Sam'l H. & Co.

Mortisers, Hand
Miller, Albert W., Mfg. Co.

Oil Filters
Burt Mfg. Co.

Ornamental Sheet Metal Work
Mullins, W. H. Co.

Ornamental Wire, Iron, Steel and Brass Work
Meyers, F. J. Mfg. Co.

Paint
New Jersey Zinc Co.
Standard Paint Co.

Parquette Flooring
Interior Hardwood Co.
Wood-Mosaic Flooring Co.

Pencils
Dixon, Jos. Crucible Co.

Planes
Gage Tool Co.
Smith, Otis A.
Tower & Lyon Co.

Plasterers' Corner Plates
New York Steel Corner Plate. Co.

Plastic Ornaments
French, Samuel H. & Co.

Plumbers' Supplies
Karol, B. C.

Porch Columns
American Column Co.
Hartman Bros. Mfg. Co.

Reflectors
Frink, I. P.

Roofing, Art Metal Tile
Mullins, W. H. Co.

Roofing and Siding
Asphalt Ready Roofing Co.
Berger Mfg. Co.
Canton Mfg. Co.
Canton Steel Roofing Co.
Drouve, G. Co.
Eastern Granite Roofing Co.
Edwards Mfg. Co.
Eller Mfg. Co
Kanneberg Roofing & Ceiling Co.
Lincoln Waterproof Cloth Co.
National Roofing Co.
Standard Paint Co.
Stowell Mfg. Co.
Wheeling Corrugating Co.

Roofing Brackets
Stanley Rule & Level Co.

Roofing Paint
Asphalt Ready Roofing Co.
Dixon, Jos. Crucible Co.

Roofing Slate
Johnson, E. J. Co.

Sash Balances
Caldwell Mfg. Co.

Sash Chains
Bridgeport Chain Co.
Morton, Thomas.
Smith & Egge Mfg. Co.

Sash Cord
Samson Cordage Works.
Silver Lake Co.

Sash Locks
Ives, H. B. & Co.

Sash Operating Devices
Hitchings & Co.

Sash Pulleys
Grand Rapids Hardware Co.

Sashes, Doors and Blinds
Foster-Munger Co.
Lestershire Lumber & Box Co.

Saw Clamps
Cardwell, C. W., Mfg. Co.
Disston, Henry & Sons.

Saw Filing Guide
Disston, Henry & Sons.

Saw Jointers
Crescent Machine Co.

Saw Sets
Taintor Mfg. Co.

Saw Tables
Chicago Machinery Exchange.
Crescent Machine Co.
Kidder, R. E.

Saw "Vises"
Grammes & Sons.

Saws
Disston, Henry & Sons.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
National Saw Co.
Simonds Mfg. Co.

Schools
American School of Correspondence.
International Correspondence Schools.

Screw Drivers
North Bros. Mfg. Co.

Sheet Metal Fronts
Mesker & Bro.

Shingles and Tiles, Metallic
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Cortright Metal Roofing Co.
Montross Metal Shingle Co.
National Sheet Metal Roofing Co.
Willis Mfg. Co.

Shingles Hip
Wheeling Corrugating Co.

Shingle Stains
Cabot, Samuel.

Shingling Kits
Coldwater Specialty Co.

Shutter Worker
Mallory Mfg. Co.

Shutters (See Blinds)

Skylights
Canton Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Drouve, G. Co.
Edwards Mfg. Co.
Kanneberg Roofing & Ceiling Co.
Mullins, W. H. Co.
Willis Mfg. Co.

Speaking Tubes
Ostrander, W. R. & Co.

Spring Hinges
Bommer Bros.

Squares
Fox, P. L.
Nicholls Mfg. Co.

Steel Figures and Letters
Sackman, F. A.

Stoves and Ranges
Boynton Furnace Co.

Structural Iron and Steel Works
Boston Bolt Co.

Structural Slate
Johnson, E. J. Co.

Tiling
Ostendorf, W. H.
Star Encaustic Tile Co.

Tool Boxes
Walter's Sons, W. P.

Tool Cabinets
Hammacher, Schlemmer & Co.

Tool Chests
Jennings, C. E. Co.

Tools
Forest City Bit & Tool Co.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
Millers Falls Co.
North Bros. Mfg. Co.
Progressive Mfg. Co.
Reed & Auerbacher Co.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S., Co.
Strelinger, C. A., Co.
Tower & Lyon Co.
Walter's Sons, Wm. P.
Wilkinson, A. J., & Co.

Turned, Molded Carved Work
Waddell Mfg. Co.

Ventilating Attachment
Drouve, G., Co.

Ventilators
Globe Ventilator Co.

Veranda Stock
American Column Co.

Vises
Hammacher, Schlemmer & Co.

Vises, Circular Saw
Grammes & Sons.

Wagon Jacks
Batavia Clamp Co.

Wax, Finishing and Polishing
Johnson, S. C., & Son.

Weather Strips
Hammacher, Schlemmer & Co.
King Mfg. Co.

Window Apparatus
Drouve, G. Co.

Window and Door Stops
King Mfg. Co.

Window Fasteners
Stanley Works.

Window Stop Adjusters
Ives, Hobart B., & Co.

Window Trimmings
Caldwell Mfg. Co.

Windows, Fireproof
Mullins, W. H. Co.

Wood Carving
Grand Rapids Wood Carving Co.

Wood Mantels
(See Mantels)

Wood Ornaments
Waddell Mfg. Co.

Wood Trimmers
Fox Machine Co.

Wood Working
Lestershire Lumber & Box Co.

Wood Working Machinery
American Wood Working Mach'y Co.
Barnes, W. F. & John.
Barnes Tool Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Cordesman-Rectin Co.
Fay, J. A. & Egan Co.
Fox Machine Co.
Kidder, R. E.
Long Island Machinery Co.
Marston, J. M. & Co.
Parks Ball Bearing Machinery Co.
Seneca Falls Mfg. Co.

Wood Working Machinery, Second Hand
ong Island Machine

LITTLE GIANT

"Victor" Scroll Saw.

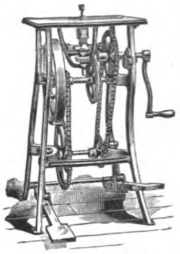
"Diamond" Mortiser.

FOOT, HAND AND POWER

WOOD-WORKING MACHINERY

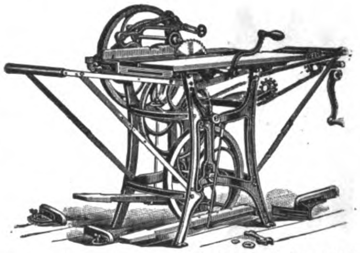
For Carpenters, Builders, Cabinet-Makers and Other Wood-Workers.

Built for Hard Work, Accurate Work and Long Service.



"Rex" Moulder.

ONE MAN with one of these machines will do the work of four to six men using hand tools; will do it easier, will do it better.



No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw.

WE GUARANTEE each machine to be thoroughly practical and accurate. Machines sent on trial, and if not found entirely satisfactory may be returned at our expense.

96

No. 8 "Union" Power Saw.

Enterprising mechanics are quick to see the superior merits of our machines. It will pay you to investigate these advantages.

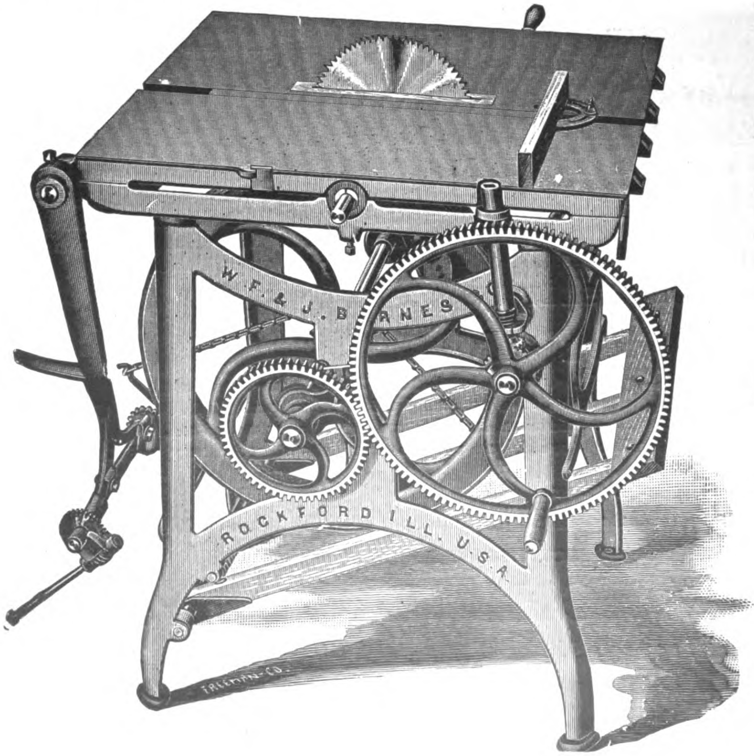
SEND FOR CATALOG "A."

The Seneca Falls Manufacturing Co.

209 Water Street, Seneca Falls, N. Y., U. S. A.

No. 6 "Union" Combination Saw.

Barnes Foot and Hand Power Machinery



For

CARPENTERS and BUILDERS.

Our New Hand and Foot Power Circular Saw No. 4, the strongest, most powerful, and in every way the best machine of its kind ever made for ripping, cross cutting and for grooving, gaining, dadoing and rabbeting. Solid iron table planed perfectly true.

We make nine other machines for Wood Workers.

The Only Complete Line of Such Machines made.

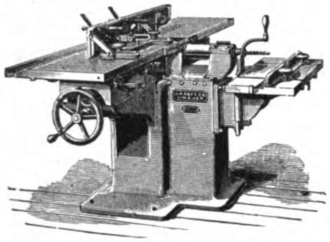
Strong,
Practical,
Durable.

Catalogue Free on Application.

W. F. & JOHN BARNES CO.

71 Ruby St., Rockford, Ill.

TWO EXCELLENT MACHINES

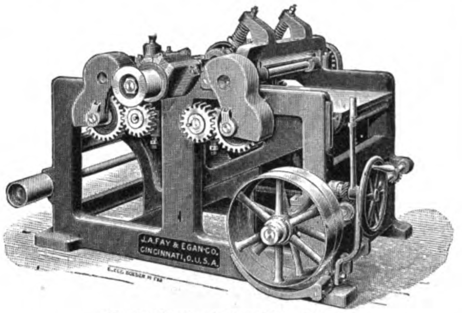


No. 62 Universal Woodworker.

Our General Catalog is Free.

For
CARPENTRY
and
BUILDING

One that will surface straight or tapering, rabbet door frames, rabbet and face inside blinds, joint, bevel, gain, chamfer; plow, raise panels, either square, bevel or ogee, stick beads, rip, cross cut, tenon, bore, rout, and in fact is only limited by the ingenuity of the operator.

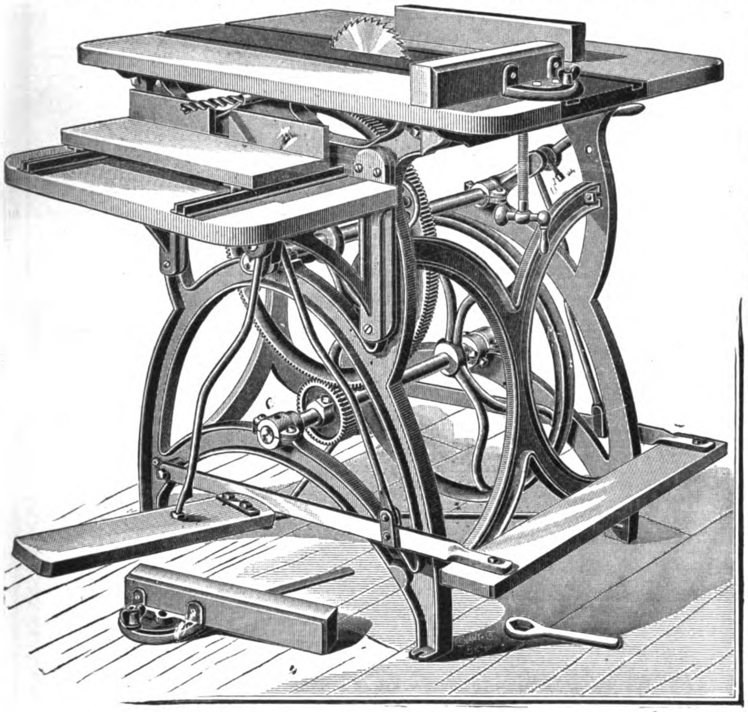


No. 156 Cabinet Smoothing Planer.

The other will save you much time, labor and expense in chiseling, scraping and rebabbitting by reason of its **Patent Sectional Clamp Bearings,** which take up their own wear. These consist of two sets of thin babbit-metal plates, five plates to a set, and can be readfly adjusted by hand.

J. A. Fay & Egan Co.
221-241 W. Front Street Cincinnati, Ohio

Marston's Hand and Foot Power Circular Saw.



Iron frame, 36 inches high.

Center part of top is made of iron accurately planed, with grooves on each side of saw for gauges to slide in.

Steel shafts and best babbitt metal boxes.

Gears are all machine-cut from solid iron.

Boring table and side treadle.

Two 7-inch saws and two crank handles with each machine.

Weight complete, 350 pounds.

Send for catalogue.

J M. MARSTON & CO., 201 Ruggles St., Boston, Mass.

Ball Bearing

MACHINERY.

Rip Saw, Band Saw, Boring and Spoke Tenoning Machine all in one. Each attachment ready for instant use, either for foot, hand or belt power.

Write for circulars and price list.

Manufactured by
Parks Ball Bearing Machine Co.
Sta. A. CINCINNATI, OHIO

VAN DORN IRON WORKS CO
CLEVELAND, OHIO.
STRUCTURAL STEEL & ORNAMENTAL IRON WORK.
JAIL WORK, JOIST HANGERS, IRON FENCINGS.

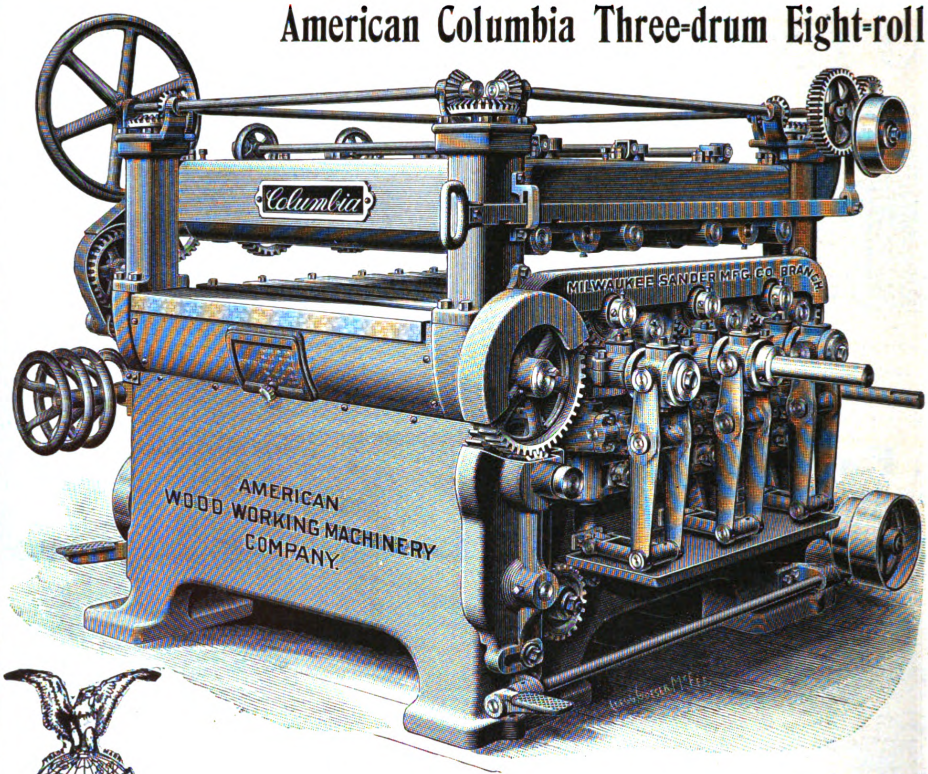
Furnace Heating.

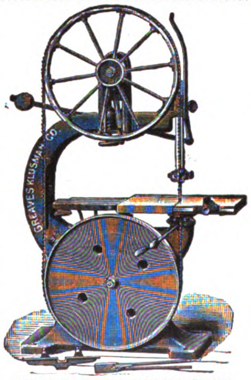
A Practical and Comprehensive Treatise on Warming Buildings with Hot Air. By William G. Snow. With an Appendix on Furnace Fittings.

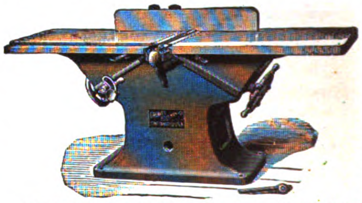
Containing 170 pages. Ninety Illustrations. In Size, 6 x 9 inches. Cloth Bound.

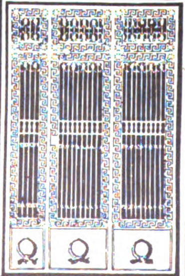
PRICE, $1.50, POSTPAID.

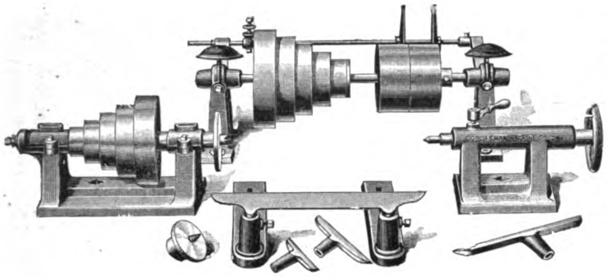
DAVID WILLIAMS COMPANY,
Publishers,
14-16 Park Place, - New York

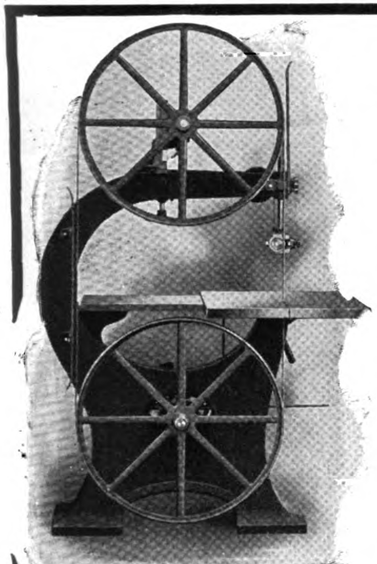

Columbia
MILWAUKEE SANDER MFG. CO. BRANCH
AMERICAN WOOD WORKING MACHINERY COMPANY.

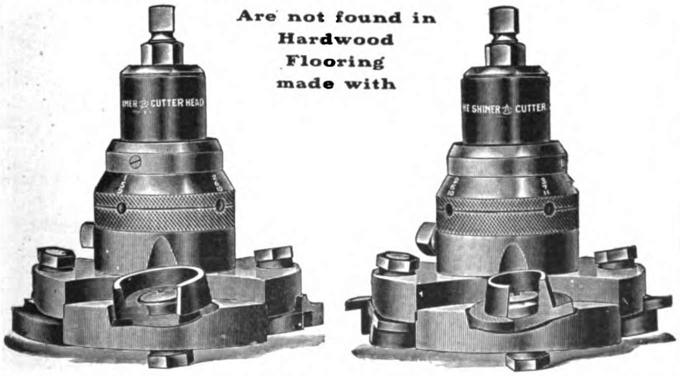






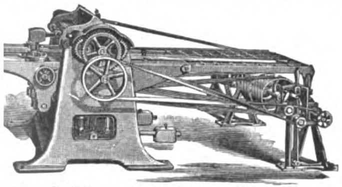





SHIMER CUTTER HEAD
THE SHIMER CUTTER

CORDESMAN, MEYER & CO., 26, 28 and 30 Central Avenue

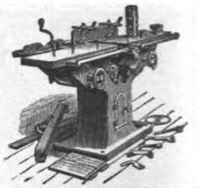
CINCINNATI, OHIO.



No. 2 Planer, Matcher and Moulder.

Manufacturers of Latest Improved

Wood-Working Machinery



Universal Wood-Worker.

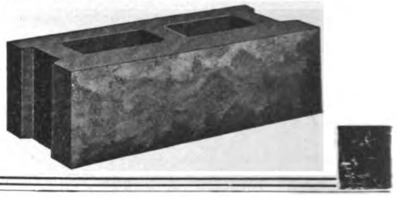
PETTYJOHN

Portable Hollow Concrete Block Machine

BEST—FASTEST—SIMPLEST—CHEAPEST
MOVE THE MACHINE—NOT THE BLOCKS

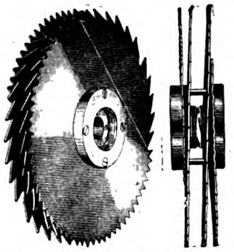
Saves labor of off-bearing, avoids loss by crackage or breakage, saves expense of heavy cumbersome iron pallets. Sand, Water and Portland Cement only materials required. BIG PROFITS. Blocks cost 6 cents to make. Sell for 18 cents. Whole outfit costs $125.00.

FULLY GUARANTEED. SENT ON TRIAL.



THE PETTYJOHN CO.,
616 North 6th St., TERRE HAUTE, IND.

FOX



Adjustable Saw Dado Heads
The best thing for cutting grooves.

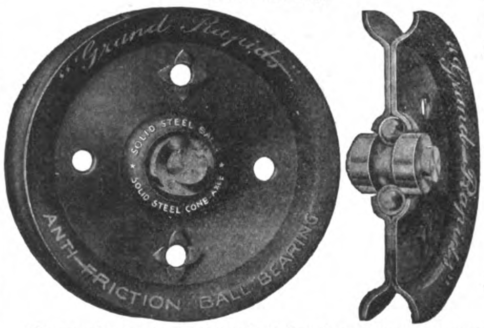
Fox Foot Power Miter Machines
The best thing for mitering mouldings and similar work.

We also make

Universal Trimmers,
Boring Machines, Lathes,
Planers, etc.

FOX MACHINE CO.
387 N. Front St., Grand Rapids, Mich

Patent Pending.



"Ball-Bearing" Grand Rapids All-Steel Sash Pulleys

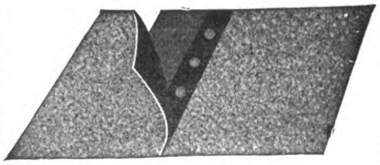
Are sold DIRECT to
BUILDERS,
CONTRACTORS
and MILLS,

At prices under the common ordinary goods.

If you make ten or ten thousand window frames, we can save you money and give you a superior sash pulley. We are the largest sash-pulley makers in the world. We ship direct, or through dealers and jobbers everywhere.
Write for catalogue and free samples and prices on half-gross, gross, barrel or any quantity.

Direct from the Makers to you. Inquiries welcome.

GRAND RAPIDS HARDWARE CO.,
PEARL STREET - - - GRAND RAPIDS, MICH.

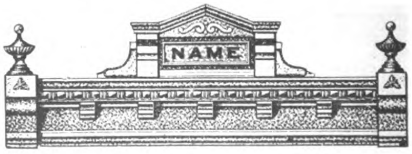


"Security Roofing"

(Reg. U. S. Patent Office)

Has a patent six joint with no nails driven through the top sheet.
Made to be laid and then forgotten.
Beware of Infringements.
NATIONAL ROOFING CO , Tonawanda, N.Y.

Cornice, Conductor Pipe,



METAL CEILINGS
HANGERS
EAVE TROUGH
VENTILATORS
SKYLIGHTS

Cat. on Application.

The Canton Manufacturing Co., - Canton, Ohio

A BOOK FOR EVERY MECHANIC

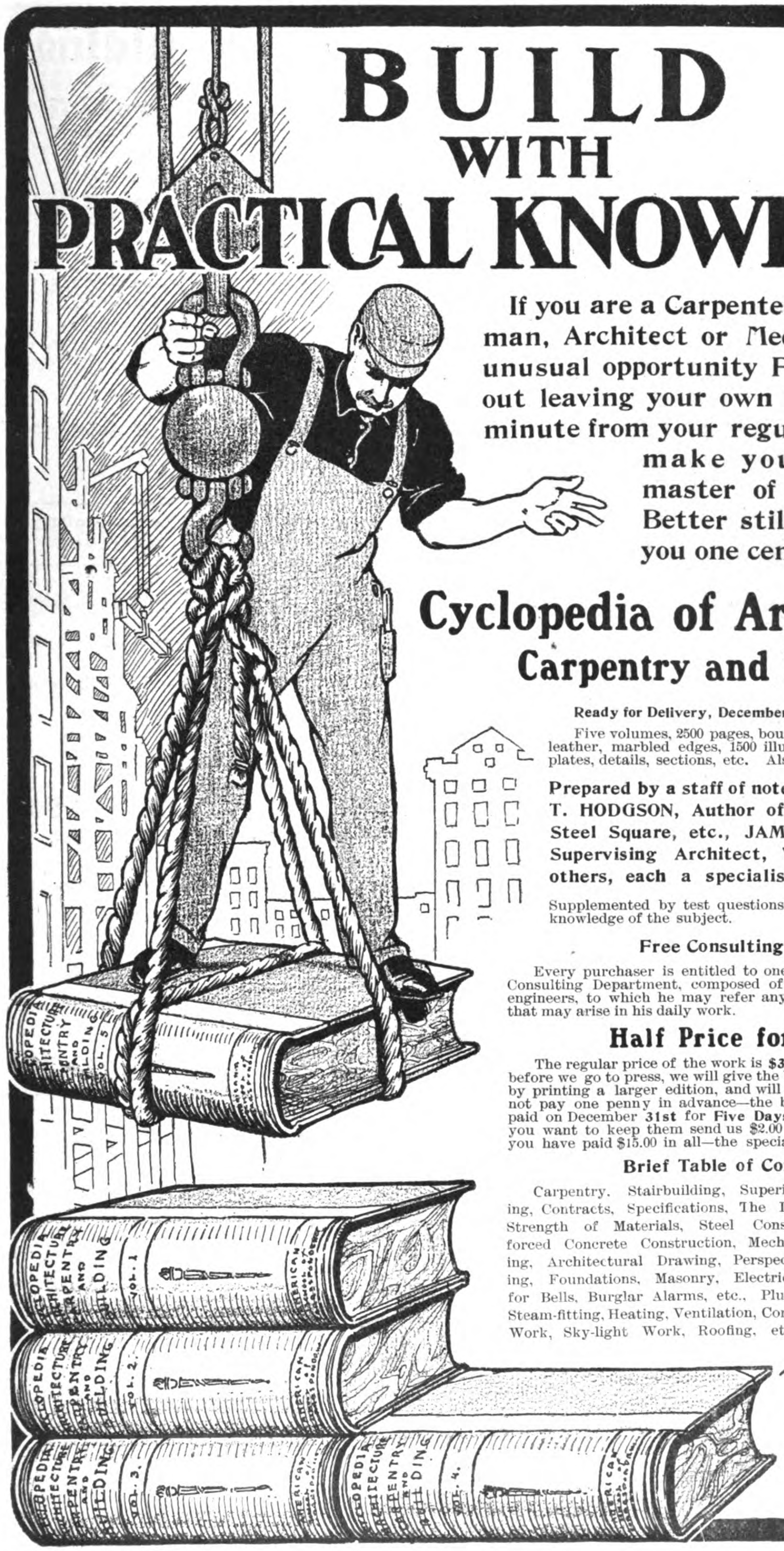
The Workshop Companion.

A Collection of Useful and Reliable Recipes, Rules, Processes, Methods, Wrinkles and Practical Hints, for the Household and the Shop.

By JOHN PHIN.

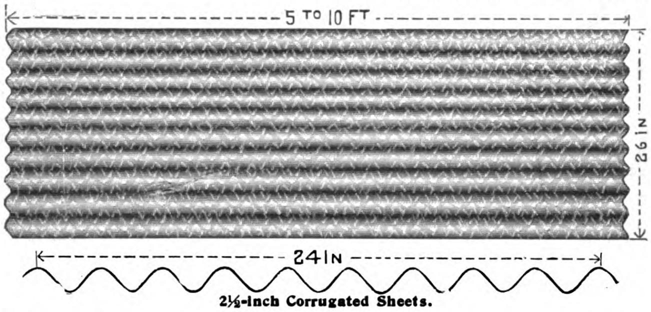
164 pages, 12mo, neatly bound in cloth. PRICE, 50 CENTS, POSTPAI

DAVID WILLIAMS CO. - 14-16 Park Place, New York.


CYCLOPEDIA ARCHITECTURE CARPENTRY AND BUILDING
VOL. 5
VOL. 1
VOL. 2
VOL. 3
VOL. 4

Corrugated Sheets for Roofing or Siding.

GALVANIZED OR PAINTED

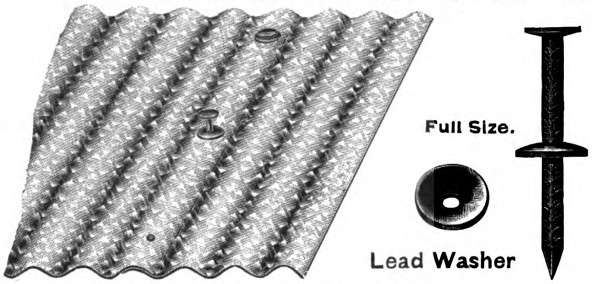


2½-inch Corrugated Sheets.

Twenty-six inches wide, 5, 6, 7, 8, 9, 10 and 12 feet long. Covers 24 inches when lapped one corrugation. Made in all gauges, 16 and lighter. 100 square feet—one square. No allowance for laps. We make ⅝-inch, 1¼-inch, 1½-inch, 2-inch, 2½-inch and 3-inch corrugations, and can furnish all except ⅝-inch in sheets 5, 6, 7, 8, 9, 10 and 12 feet; ⅝-inch in 8-foot sheets and shorter. All of the best material and workmanship. Write for prices.

Use LEAD WASHERS to Nail on Metal Roofing and Siding.

One pound—about 325 washers. One pound required for 2 to 3 squares Roofing.
Packed in boxes containing 100 pounds. Place Washer on Nail before driving.



No matter what kind of Metal Roofing you want, we make it. Write to us.

Lead Washers make an absolutely water-tight joint under the Nail head.

Prevents rusting and loosening around the Nail.

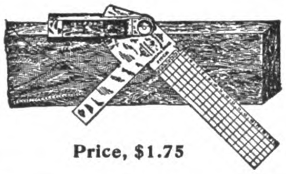
The use of Lead Washers adds much to the life of Metal Roofing.

Lead Washers are Cheap. Write for Samples and Prices.

BRANCH OFFICES AND WAREHOUSES:

New York City - 47-51 Cliff St.
Chicago, - 23-27 N. Clinton St.
St. Louis, 112, 114, 116 So. Eighth St.
Philadelphia, - 402, 404, 406 Race St.
Boston, Mass., - 132 and 134 Pearl St.
Chattanooga, Tenn., - King St.

MANUFACTURED BY
WHEELING CORRUGATING CO.
WHEELING, WEST VIRGINIA.



Price, $1.75

TOPP'S FRAMING TOOL.

A PERFECT TOOL and the only Tool for the purpose ever invented.

Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

Write for booklet. Address the manufacturers,

G. A. TOPP & CO., - Indianapolis, Ind.

SECURE
PROTECTION AND LONG
SERVICE BY USING OUR
ASPHALT ROOFING
SAVES REPAIRS
SAVES RECOATING
SAVES RENEWING
Send for Samples and Pamphlet
STOWELL MFG. CO.
JERSEY CITY, N.J.

RED ROOFING

PAT. NOV. 22, 1904.

FOR 15 YEARS

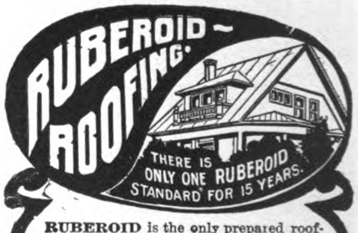
RUBEROID HAS BEEN RECOGNIZED AS THE STANDARD PREPARED ROOFING. AS NOW MADE IN COLORS, RED AND BROWN, IT ENSURES YOU

A PERMANENT ROOFING
WITH
A PERMANENT COLOR.

A COMBINATION OF BEAUTY AND WEATHER AND FIRE PROTECTION. ANY HANDY MAN CAN APPLY IT.

SEND FOR SAMPLES.

THE STANDARD PAINT COMPANY
Sole Manufacturers,
100 William Street, New York.

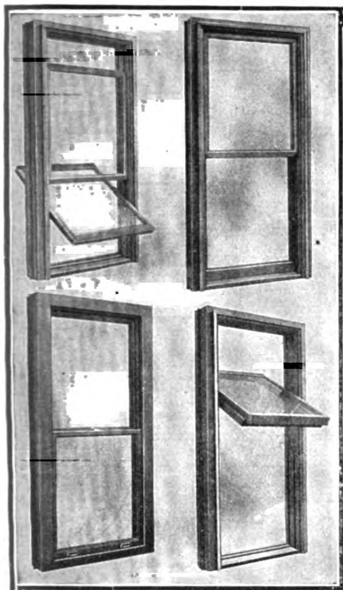


RUBEROID is the only prepared roofing which can truthfully be said to outlast metal and shingles, Costs less, easier to apply, requires less attention. Makes a sound, seam-tight roof, flat or sloping, unaffected by expansion or contraction, and suitable for poultry house, barn or handsome residence.

RUBEROID contains no tar, paper, rubber or other short-lived ingredients to crack, dry up and become useless with age. Made from the finest wool felt, saturated with a patented water-proof and fire-resisting compound. Retains its elasticity and flexibility indefinitely.

Any handy man can apply it. Full instructions and fixtures free with every roll. Let us tell you more about Ruberoid. Write for samples and booklet

THE STANDARD PAINT COMPANY,
SOLE MANUFACTURERS,
100 William St., New York.
Chicago, Cincinnati, St. Louis.



Proved Best by Every Test

Mullins Fireproof Window

is absolutely fireproof and actually does what no other window can do—it stands every test. **Ask for an estimate** or write for our convincing catalogue.

The W. H. Mullins Co.

208 Franklin Street, - - - Salem, Ohio.

We also make everything in architectural sheet metal work—statuary, skylights, wrought iron grilles, cornices, etc. 120-page catalog of stock designs on request.

A METAL SHINGLE ROOF

"THE EDWARDS KIND"

A guaranteed protection against fire and the elements, taking a very low rate of insurance. Made of best grade Worcester Terne Tin, Painted or Galvanized, in sizes 7 x 10, 10 x 14, 14 x 20 inches.

Write for Descriptive "Shingle Booklet" and Prices.

THE EDWARDS MANUFACTURING CO., "THE SHEET METAL FOLKS"

423 to 443 Eggleston Ave., Cincinnati, O.

Manufacturers of the most extensive line of SHEET METAL Building Material in the world.

TOP IT OFF

With our

No. 76 Cresting

and be proud of your roof finish. Send for catalog No. 5 showing a very complete line of architectural metal work.

STEEL CEILING is a leading feature with us.

We make the W. H. Miller Patent Metal Window Frames and Sash. Special catalog on these. Originators of the hip shingles.

WILLIS MFG. CO., - - Galesburg, Ill.

Carpenters: Who is going to lay the roof of the building on which you are working? If you're not, stop and think a minute, couldn't you do it? Certainly if it's a Cortright Shingle roof you could, and you ought to, because you'd make money and make it easily. Let us tell you why.

WANTED: A thousand carpenters that are dissatisfied with their present wages and want to make money easily, write to

CORTRIGHT METAL ROOFING CO.

PHILADELPHIA CHICAGO

"STAR ENCAUSTIC TILE CO.,"

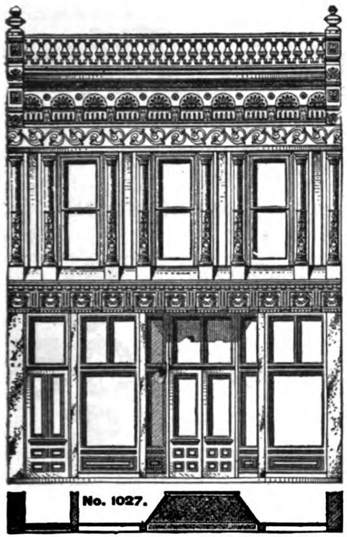
MANUFACTURERS OF

Superior Unglazed Encaustic Tile

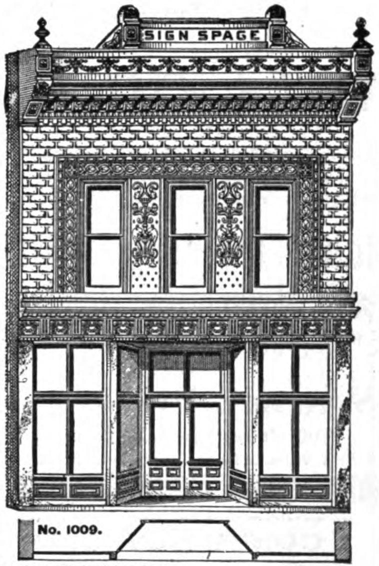
For Floors in Stores, Churches, Depots, Kitchens, Halls, Porches, &c.

Office and Factory, Bluff Street, near 61st,

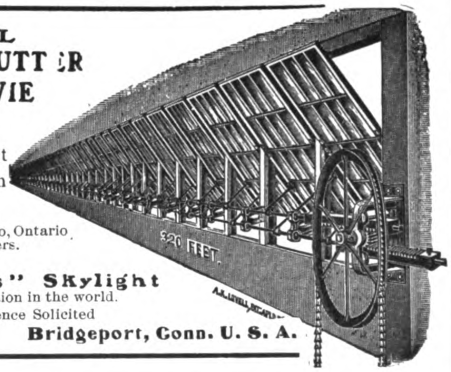
PITTSBURG, PA.

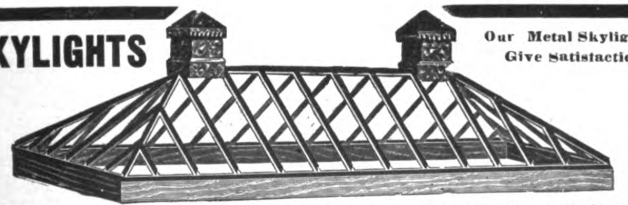


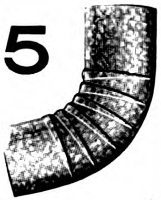
No. 1027.



No. 1009.







"AMERICAN"

Polygon Conductor Pipe

Can be furnished in either Galvanized Iron or Copper.
It is made from galvanized iron in 10-ft. lengths,
without a cross seam; from copper in 8-ft. lengths.

American Rolling Mill Co., MIDDLETOWN, OHIO.

STORE ELEVATOR FOR $105

COMPLETE, READY TO ERECT, MADE BY THE HUNDRED. SIMPLE IN CONSTRUCTION. EASILY CARED FOR. OTHER STYLES AND PRICES TO SUIT.

The Warner Elevator Mfg. Co.
2100 Valley St., CINCINNATI, O.
NEW YORK OFFICE: 2032 PARK ROW BUILDING.

ARCHITECTS! CONTRACTORS! BUILDERS!

When you want any STRUCTURAL WORK it will pay you to write to the

BOSTON BOLT COMPANY
ESTABLISHED 1872

Works, Offices and Salesroom
38-54 Farnsworth Street

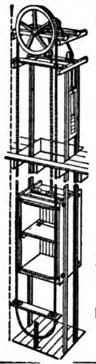
Convertors of Iron and Steel into Bolts, Expansion Bolts, Nuts, and all kinds of Structural Work for Mills, Churches, Halls, Factories, Bridges, Wharves, Etc., and Iron Work of all kinds forged and made to order. *Send for catalog.*

JOHN W. CROOKS, Treasurer
BOSTON, MASS.

COPPER LIGHTNING RODS

ABSOLUTE PROTECTION from LIGHTNING is give by use of our continuous copper conductors.

E. G. Washburne & Co., 46 Cortlandt St., New York
Telephone 3125 Cortlandt.
Work put up or material furnished.



DUMB WAITERS AND HAND ELEVATORS

- Trunk Lifts,
- Invalid Lifts,
- Carriage Elevators,
- Freight Elevators,
- Sidewalk Elevators
- Hatchway Hoists

All of most improved design and construction.

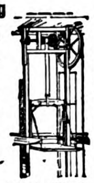
Sedgwick Machine Wks.,
88 Carroll Street,
POUGHKEEPSIE, N. Y.
New York Salesroom, 128 Liberty St

Catalogue on application.
Estimates on request.

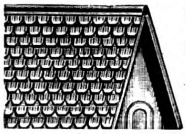
Improved Quick and Easy Rising Steam, Electric and Hand Power Safety

ELEVATORS

AND DUMB WAITERS.
Automatic Hatch Gates.
Send for Circulars.



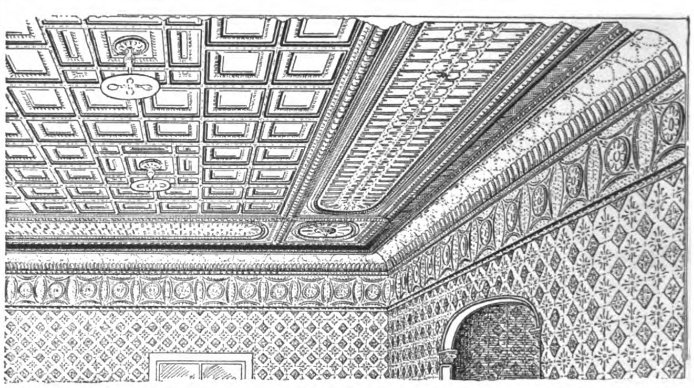
KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kimball Elevator Co., Cleveland, Ohio, 245 Vincent St
Branch Offices:
120 Cedar St., New York. 108 11th St., Omaha, Neb



Carpenters

Do you want work laying Montross Metal Shingles? If so—
Write to day to

Montross Metal Shingle Co., CAMDEN, N. J.



THE KINNEAR

LOCK-JOINT STEEL CEILING, Etc.

Has no equal. Try it and be convinced. Prices reasonable.
Catalog upon request. Send measurements for estimate.

The Kinnear & Gager Co., M'f'r's, COLUMBUS, OHIO
BOSTON, 125 Broad St.

We make Ceilings for churches, schools, stores, lodge rooms, court rooms, libraries, residences, etc.

Our ceilings are shipped ready for erection. No expert labor required. Working drawings furnished. They're adapted to any kind of building. Exclusive in classified design.

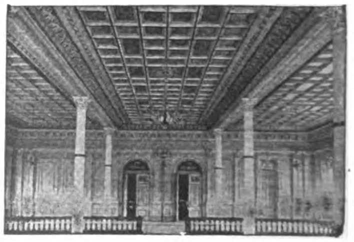
Berger "CLASSIK"

Steel Ceilings

We also make Steel Roofing, Siding, Metal Shingles, Architectural Sheet Metal Work and Fireproofing Material.

Our catalogues sent you free. Ask for them.

THE BERGER MFG. CO.
CANTON, OHIO.
New York. Boston. Phila. St. Louis



BUY . . . . LUMBER DIRECT

WE MANUFACTURE ALL KINDS.—MOULDINGS, WINDOWS, DOORS, BLINDS. MIXED CARS, INCLUDING EVERYTHING FOR A BUILDING. STRAIGHT CAR-LOADS SHINGLES, SIDING, FLOORING, WHITE PINE, AT WHOLESALE PRICE.

"Our complete Catalog and Price List of all kinds of Building Material would be a great help to you in figuring."

LESTERSHIRE LUMBER & BOX CO., LESTERSHIRE & BINGHAMTON, NEW YORK.

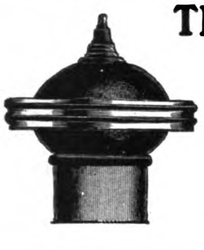
THE brightest, smoothest and handsomest finished wood work will not please your eye better than your own work finished with

FRENCH'S ELASTIC FINISHES Interior and Exterior.

Made to withstand hardest use.

Samuel H. French & CO., Varnish and Paint Manufacturers

Established 1844. York Ave., 4th & Callowhill Sts., Philadelphia, Pa.



THE "GLOBE" VENTILATOR

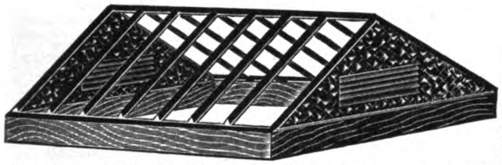
In Brass, Copper, Galvanized Iron and with Glass Tops for Skylight Purposes. Also

"Globe Ventilated Ridging"

For Barns, Residences and Buildings of every character. Far superior to a Cupola.

Send for Description and Price List.

Manufactured by **GLOBE VENTILATOR CO.** Troy, N.Y.

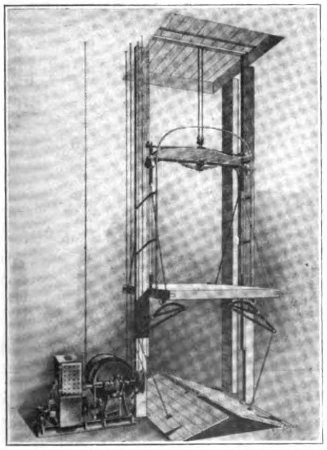


ART METAL CEILINGS

Exclusive and Artistic Designs appropriate for any style of architecture.

All Styles Galvanized and Copper Skylights, Cornices, Finials, Crestings, Ventilators, Metal Shingles, Roof Gutters. all styles painted and galvanized Iron Roofing and Siding, etc. Write for Catalogue and Prices. Estimates free.

Kanneberg Roofing & Ceiling Co.,
Manufacturers,
CANTON, OHIO.



A New Type of

Electric Freight Elevator

at a moderate price.

This elevator is considerably cheaper than our standard direct electric machine and costs but little more than our belt connected machine.

CAPACITIES:

2500 lbs. at 55 feet per minute
(Without trap-doors)
2000 lbs. at 75 feet per minute
1500 lbs. at 100 feet per minute

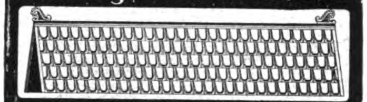
Steel worm, bronze rimmed gear wheel. Ball bearing end thrusts.
Motor of our own make especially designed for elevator service, compound wound, slotted armature core.

If interested in elevators write us.

MORSE, WILLIAMS & CO.
Dept. of Otis Elevator Co.
PHILADELPHIA ATLANTA BOSTON

WALTERS'

Shingles that last



Made from Galvanized Tin and Painted Tin

STORM, RUST AND FIRE PROOF

Do you want to increase your business? THIS IS YOUR OPPORTUNITY. Write for catalogue, samples and prices.

National Sheet Metal Roofing Co.,
JERSEY CITY. N. J.

Contract For Sale

I will sell a contract with a large and well known architectural consulting establishment to furnish me expert advice as asked for for two years' covering any feature or detail of building, with privilege to buy plans at a special discount, and include a complete Encyclopedia of Carpentry and Building in nine volumes, covering Carpentry and Joining Treatise on the Steel Square, Stair Building, Architectural Drawing, Estimating Guide, Hot Water Heating, &c., all for $27.00 cash or installments.

The books alone are worth $36.00 obtained in the ordinary way. and the consulting and plan privilege is worth many times more. Address

"SACRIFICE"

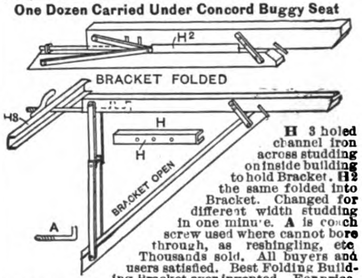
4th floor, 880 Lexington Ave., New York.

MARK YOUR TOOLS WITH A STEEL STAMP.

SEND FOR PRICE-LIST, No. 7

FOLDING BUILDING BRACKET (Patented)

One Dozen Carried Under Concord Buggy Seat



H 3 holed channel iron across studding on inside building to hold Bracket. H2 the same folded into Bracket. Changed for different width studding in one minute. A is couch screw used where cannot bore through, as reshingling, etc. Thousands sold. All buyers and users satisfied. Best Folding Building Bracket ever invented. For price, particulars, etc., write **A. H. Danforth, Monson, Mass.**

Diamond Expansion Bolt.

Patented.

For fastening fixtures, timbers, etc., to brick, stone concrete or other masonry.

DIAMOND EXPANSION BOLT CO.,
9-11-13-15 Murray Street, New York, N.Y

LOOK OVER THE SIMONDS SAWS, and you will see the points of advantage.

FIRSTLY, they are ground a true taper, which enables the user to run the Saw with very little set.
SECONDLY, each Simonds Saw is handled by a mechanic who thoroughly understands the hanging of the Saw, which guarantees this most important feature.
THIRDLY, the filing and setting of the Simonds Saws are carefully done, and thoroughly inspected, so that the Saws, on leaving the factory, are ready for work.
FOURTHLY, the steel used in the manufacture of the Simonds Saws is a high carbon crucible steel, and will hold its cutting edge much longer than the ordinary steel generally used.
FIFTHLY, each Saw is put up in a separate case, thus avoiding fingering and rust marks commonly found on Saws that are not encased properly.
SIXTHLY, because every Simonds Saw is guaranteed thoroughly.

Any mechanic trying a Simonds Saw, and not finding same satisfactory, may return the Saw, either to the dealer or to the Simonds Mfg Co., and get either a new Saw or money paid back.

SEND FOR CATALOGUE AND PRICE LIST.

SIMONDS MFG. CO.,

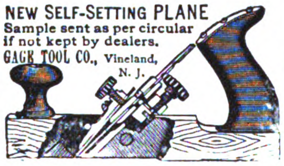
Fitchburg, Mass. Chicago, Ill. New York, N.Y.
Portland, Ore. Seattle, Wash.
SIMONDS MFG. CO., Ltd., New Orleans, La.
SIMONDS SAW CO., San Francisco, Cal.

STANDARD MINERAL WOOL

LOOKING ALL WAYS FOR BUSINESS

COLUMBIA MINERAL WOOL CO.,
Room 918, 112 Clark St. CHICAGO.
Samples and Circulars Free

NEW SELF-SETTING PLANE
Sample sent as per circular if not kept by dealers.
GAGE TOOL CO., Vineland, N. J.



Irons warranted.
Plane is returned
money refunded.

Fireplace Mantels
MADE OF
Ornamental Brick
$12 and up.

Last longest—look best—are not too costly.
There's no other kind so good—so pleasing.
Our Sketch Book tells all about them.
Write for it.

PHILA. & BOSTON FACE BRICK CO. - P. O. Box 8613 - BOSTON, MASS.

OUR FINE HARDWOOD FLOORING
SHOULD BE THE BEST.

We have been making PARQUETRY for TWENTY YEARS. We have our own saw mill and timber tracts and two factories. Send for our trade discounts and our Design Book No. 5.

WOOD-MOSAIC FLOORING CO.
ROCHESTER, N. Y. NEW ALBANY, IND.

Bolcoa
TRADE MARK
ETCHING FLUID

Marks your tools in a manner impossible to erase without destroying article itself. Price 25 cents.

A FULL LINE OF
CARPENTERS' TOOLS
Let Us Know Your Wants

Reed & Auerbacher Co.
229 Bowery, N. Y.

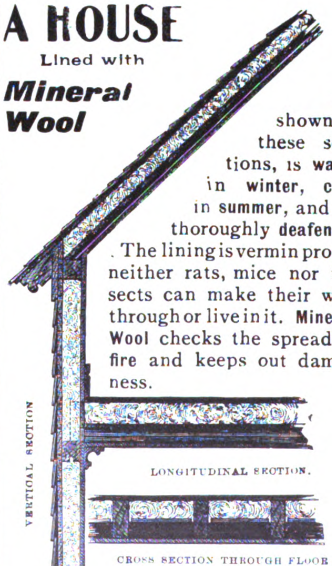
Wide awake specialty men to sell several articles of merit in the Roofing line—quick sellers—liberal commission.
Address X. Y. Z.,
Care *Carpentry and Building*,
Fisher Building, Chicago, Ill.

All Manner of Handy Rules for the Estimator are given in . . .
HODGSON'S
Estimating Frame and Brick Houses

ONE DOLLAR, POSTPAID.

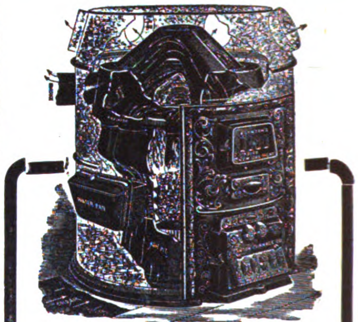
DAVID WILLIAMS CO., 14-16 Park place, N. Y.

A HOUSE
Lined with
Mineral Wool



As shown in these sections, is warm in winter, cool in summer, and is thoroughly deafened. The lining is vermin proof: neither rats, mice nor insects can make their way through or live in it. Mineral Wool checks the spread of fire and keeps out dampness.

Sample and Circular Free.
U. S. MINERAL WOOL CO.,
143 Liberty St., New York.



The Boynton Furnace Co.
SOLE MFRS. OF
Boynton's Furnaces,
Ranges,
Hot Water Heaters,
Steam Heaters, Etc.

207-9 Water Street, New York.
147-9 Lake Street, Chicago.

EVERY Builder who reads, investigates and progresses will have a copy of Kidder's Strength of Beams, Floors and Roofs. $2.00 prepaid.
DAVID WILLIAMS CO., 14-16 Park Place, N. Y.

Carpentry and Building

New York, November, 1906.

Brick Veneer and Frame Residence in Worcester, Mass.

THE dwelling which we illustrate by means of one of the half-tone supplemental plates accompanying this issue and the elevations, floor plans and constructive details given upon this and the pages which follow embody in its construction and arrangement many features likely to interest architects and builders, as well as those seeking homes of their own. In the treatment of the exterior the front and two sides of the first story are veneered with sand struck brick, with brownstone trimmings, while the second story is shingled and the gables are finished in what is known as English cottage style. The effects are produced by dividing the gables into panels and covering them with two coats of cement plaster over metal lath. The rear of the first story is clapboarded. The interior is planned with careful consideration to the convenience and comfort of the occupants. The finish of the main front portion of the first story is in birch and the rear in hard pine, while in the second story and attic it is cypress, all finished with shellac and varnish. The floors for the most part are hard wood.

Section and Front Elevation.—Scale, ⅛ In. to the Foot.

Brick Veneer and Frame Residence in Worcester, Mass.—John P. Kingston, Architect.

The color scheme is red brick for the first story and for the second story shingles, it is a Van Dyke drab or a drab with a light brownish tint. The gable plaster is colored the same tint and the trimmings are a dark brown, with the roof a dark cherry red.

The house was recently erected on an attractive site in Worcester, Mass., in accordance with drawings prepared by John P. Kingston, architect, 518 Main street, of the city named. According to the specifications the foundations are of quarried junk stone, the walls averaging 21 in. thick. The underpinning wall at the rear is 9 in. thick and all other parts are 15 in. thick, with a 3-in. air space, as indicated in the details. The entire first story, including piazza piers and buttresses, where shown, are of brick, the walls being covered or veneered with one course of brick kept away from the boarding 1 in. and well fastened with wall binders in a thorough manner. The sills and caps shown on the exposed brickwork in the basement and first story are made of even color brownstone.

The gable walls were first covered with one thickness of tar paper laid on horizontal and lapped 2 in. The furring is ⅜-in. thick, on which is placed expanded metal wire lath, this in turn being covered with two coats of Portland cement plaster made as follows: First a lime paste was made by slacking it at least six days before

using and then mixing it with sand, this being made in the proportion of 1 barrel of lime to 4 barrels of sand. When ready for use a separate cement mortar was made in the proportion of 6 barrels of Portland cement to 9 barrels of sand. These were then all thoroughly mixed together with sufficient hair to make good work. The first coat was a scratch coat and the second a dash coat, all being finished with a tool covered with carpet instead of a steel tool.

The cellar has a clear hight of 7 ft. 6 in., and the cellar bottom is covered with cement concrete 2 in. thick. All exposed parts of brick and stone work in the cellar have two coats of whitewash. The interior walls and ceilings of the entire building where finished have one coat of plaster mortar, then a second coat of sand and putty finish.

Brick Veneer and Frame Residence in Worcester, Mass.—Side (Left) Elevation.—Scale, ⅛ In. to the Foot.

It will be observed from an inspection of the floor plans that there are two fireplaces, the one on the first floor having glazed tile facings and hearth, with red faced brick linings, and the one on the second floor red faced brick, with molded parts, where shown, the latter being furnished by the Philadelphia & Boston Face Brick Company.

Specifications.

The specifications for the carpenter work, painting, plumbing, electrical work and inside and outside finish are such that we present the following copious extracts:

Carpenter Work.

Framing, Etc.—The framing work is to be done, as shown by drawings. All in a thorough manner, placing joist, rafters and girders crowning edge up and rounding edge of studs all one way. To have large joist under cross partitions.

All partitions to have a sill and cap same size as studding.

All corners and angles to be made solid, and all openings and corners to have a piece nailed on to secure base.

The roof to be framed as per drawings. The hips, valleys, jacks and common rafters to fit closely at both ends and all well nailed and spiked.

Truss over all openings at right angles to joist.

Ceiling Furring.—All ceilings above cellar to be cross furred with ⅞ x 2½ in. planed spruce strips put on 16 in. on centers.

Rear Porch Supports.—To be of 2½-in. iron, with iron plate at top.

Cellar Beam Supports.—The girders in cellar to be supported by 3½-in. iron posts, with cap about 7 in. square.

Floor and Partition Bridging.—All joist to be bridged with ⅞ x 2½ in. spruce strips cut to fit at both ends and fastened with two nails at each end.

Bridge all main partitions, first floor, with 2-in. stock.

Timber.—All the framing and dimension timber to be good merchantable square edged sawed spruce, and to be of the following sizes as marked:

First floor girder, 8 x 9 in.; sills, 4 x 7 in.; first floor joist, 2 x 9 in.; second floor joist, 2 x 8 in.; third floor joist, 2 x 7 in.; collar beams, 1 x 7 in.; rafters, 2 x 6 in.; hips and valleys, 3 x 9 in.; posts, 4 x 6 in.; ledgers, 1 x 6 in.; braces, 1 x 6 in.; wall studs, 2 x 4 in.; main partition studs, 2 x 3 and 2 x 4 in.; piazza sills, 6 x 6 in.; piazza joist, 2 x 6 in.; piazza rafters, 2 x 6 in.; wall plates, double, 2 x 4 in.

Furnish all other framing and dimension timber to complete the work of sizes shown by drawings or directed.

All joists, studding and furring to be placed not more than 16 in. apart on centers, with rafters and collar beams 24 in. on centers.

Plaster Grounds and Beads.—Put ¾-in. grounds around all openings and at bottom of all partitions and beads or corners to plaster against.

Bottom Floors.—To be done with ⅞-in. square edge planed hemlock, laid close and well nailed.

Wall Boarding.—To be done with ⅞-in. planed, tongued and grooved spruce boards, laid close and well nailed.

Roofing Boards.—To be done with ⅞-in. square edge planed hemlock or spruce boards, laid open about 2 or 2½ in., except valleys, which can be laid close; all to be well put in place and nailed.

The tin roof of front balcony to be done with matched boards.

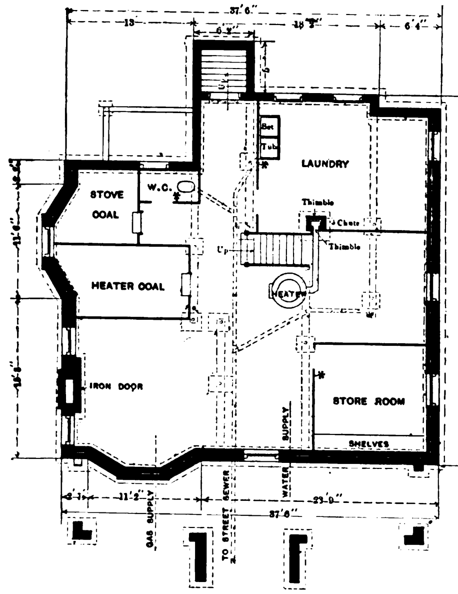
Sheathing Paper.—Put Neponset black or two-ply P. & B. or other approved sheathing paper, well lapped under all finish, clapboards, brickwork and side wall shingling. Put Florian paper under all top floors and two thicknesses between floors at all projections. The walls of gables where plastered to be covered with one thickness of good roofing tar paper.

Clapboarding.—The rear part of first story to be covered with 5½-in. spruce clapboards to show 4¼ in. to the weather.

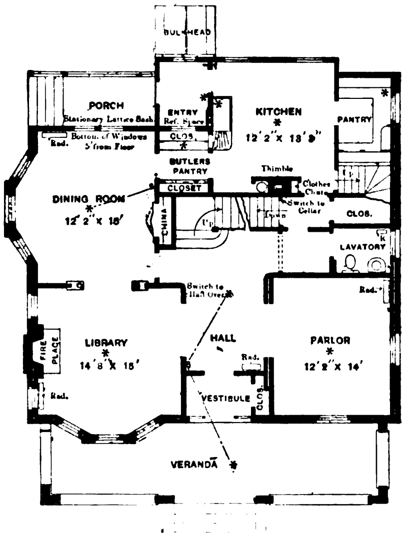
Second Story and Veranda Shingle.—To be done with best quality clear butt 16-in. cedar shingle, laid 5 in. to the weather. The courses to be laid even and level, each shingle fastened on with two cut nails.

Roof Covering.—The main roof and part of veranda to be covered with best quality sawed 16-in. cedar shingle. The main roof laid 4¾ in. to weather and the veranda 4¼ in. to weather. The hips to be covered with a braided course. The valleys to be laid open on top of 14-in. tin well, painted both sides. Flash up tight against chimneys, dormers and other places. Ridges to be covered with pine boards, with ridge roll. Tops to have wood finials, as shown. All parts well fitted and flashed tight.

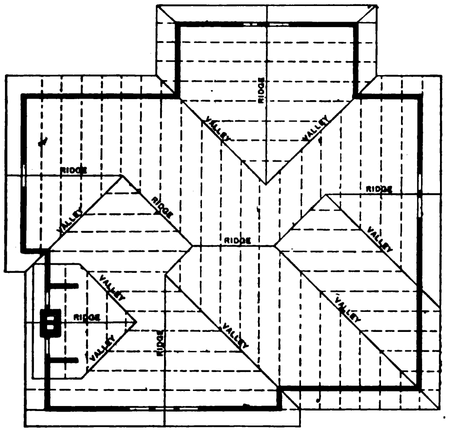
Tinwork.—The roof of front balcony to be covered with an approved best quality roofing tin, painted under side two coats before putting on and one coat on top before any woodwork is put over it. To have gutters at edge and a 2½-in. corrugated conductor near to ground.



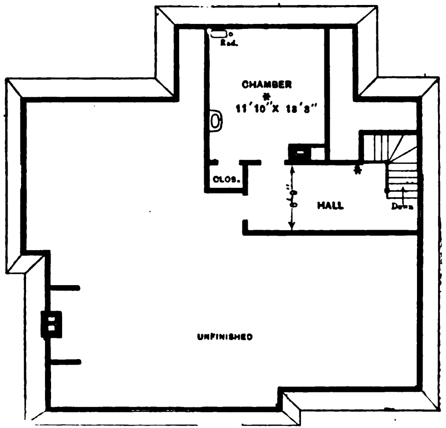
Foundation.



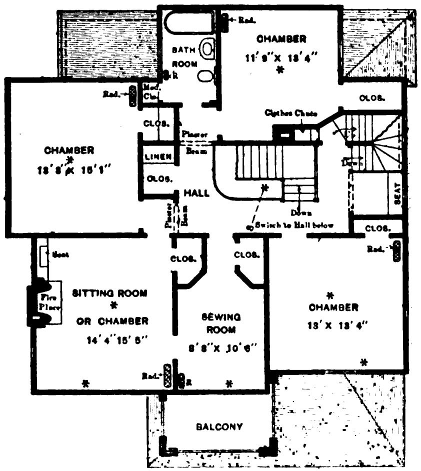
Main Floor.



Roof Plan.



Attic.



Second Floor.

Brick Veneer and Frame Residence in Worcester, Mass.—Floor Plans.—Scale, 1-16 In. to the Foot.

Cellar Work.—The laundry partitions to be done with 2 x 3 studs and matched spruce boards closed up tight. The doors to be made of matched pine boards. The coal bins to be made with 2 x 4 studs boarded up 6 ft. high with matched boards. To have opening with coal hole at bottom. Put up all necessary strips, shelves, &c., for the several fixtures.

Finish Work for Outside.

Front Veranda and Rear Porch.—To have a floor of 1⅛ in. x 5 in. square edge rift grain Southern yellow pine laid open ⅛ in. The ceilings to be of clear cypress or North Carolina pine sheathing, with 2-in. bed molding. The balustrade, columns, lattice, &c., to be formed and built, as shown or marked.

Door Frames for Outside Doors.—To be 1¾ in. thick, rabbeted to fit the thickness of doors with 1¾-in. hardwood thresholds and casings same as windows. Frames for front door to be as above, with division pieces for door and side lights. The side lights to be 1½ in. thick, cut up as shown.

Window Frames.—To be made, as shown, by drawings, and to fit their respective positions. Cellar frames to be made of 2-in. plank, fitted with 1¼-in. sash. These to have sills made wide enough to project by brick work ½ in., to have 1-in. staff bead around sides and top. Frames above to be made to fit their several positions, to have ⅞-in. yellow pine pulley stiles, grooved for 1⅜-in. lip sash. To be fitted with approved 2-in. steel bronze finish face axle pulleys well fitted in place. To have molding around outside to fit brick, shingle and clapboards against.

Window Sash and Glass.—All frames, not otherwise specified, to be fitted with best pine double sliding lip sash 1⅜ in. thick, glazed with first quality American sheet glass, double thick for all one and two light sash and single thick for small lights. To be hung and evenly balanced with cast iron weights and Silver Lake or Samson best quality sash cords made to run smooth and even. Cellar sash to be 1¼ in. thick, hung at top with two 3-in. wrought butts. To have a sash lock fastener and fixtures to hold open.

Front and Rear Doors.—The front door to be best quartered oak 1¾-in. thick and molded. To have raised panels and clear bevel edge plate glass in top, where shown. Sides to have oak panels, with sash cut up, as shown, and glazed with best quality plain glass.

The rear door to be best N. C. pine, 1¾-in. thick, flush molded and No. 1 double thick glass in top panels.

Inside Finish and Work.

Wood for Floors.—The top floors in rear parts first story to be of best planed and matched ⅞ x 3 in. face width birch flooring, blind nailed, laid close, with running joints and well smoothed up. Where practicable in rooms to be laid crosswise of lining floors.

The parlor, library, dining room, front hall and vestibule to have a top finished floor of best ⅞ x 2½ in. birch flooring, driven together. To be blind nailed, laid close, with running joints laid crosswise of lining floors. All hardwood floors to have a one-quarter round in angle.

The floor of second story and attic to be done with best quality slash grain N. C. pine flooring not more than 4 in. wide. To be well matched and laid close together, blind nailed and well smoothed up.

Wood for Finish.—The finish to be as follows:

The vestibule, front hall, dining room and library to be finished with best birch.

The kitchen, pantries, rear entry to be finished with best N. C. hard pine.

The second floor and attic and all closets to be finished with best cypress to finish natural.

The parlor to be finished with whitewood to paint.

Door Jambs.—To be 1⅜-in. thick. Sliding door and cased opening jambs to be ⅞-in. thick.

Doors.—The doors leading from front hall, parlor, library and dining room to be 1½-in. thick, four raised panels, molded edges. Remaining doors to be 1⅜-in. thick, five cross panels. Slide doors to be 1¾-in. thick, same style as others.

Door and Window Finish.—The front hall, vestibule, parlor, library and dining room to have 1 x 5 in. architraves and plinth blocks. All other rooms ⅞ x 4½ in. casing, 1 x 4¾ in. corner blocks with turned center. Windows to have stools 1 in. thick and 4 in. aprons. Stop beads to be ½ in. thick, tops nailed in and sides fastened in with flat head brass screws, four to a side. The cased openings to be as marked by drawings and details.

Sheathing, Wainscoting.—The kitchen and rear entry to be sheathed 3 ft. 6 in. high, bathroom and lavatory 4 ft. high, with narrow beaded sheathing put on vertical blind nailed and have molded cap.

Seats.—Fit up seats in hall and sitting room, second floor. The one in hall to have ⅞ in. seat board with 4 in. apron across under front. The backs to be ½ x 8 in. lipped cap on top returned at ends.

The one in sitting room to have seat and back same as other. The front to be formed with a tight board with base across at bottom and surbase at top. To be a tight box inside and lid on top to open.

Clothes Closets.—The closets to have a 6-in. bevel base and 4 in. plain castings, two rows of beaded strips with wardrobe hooks and shelf.

Working Pantry.—To have a wide shelf with case of drawers under. Other parts to be sheathed in with beaded sheathing and doors, and have barrel swing to hold flour barrel, above wide shelf to be four narrow shelves all resting on rabbeted cleats. Shelves shown to be closed in from bottom narrow shelf to top shelf and have two panel doors.

Butler's Pantry.—To have wide shelves up 2 ft. 10 in. from floor, one side to have a case of drawers under. Over to be four shelves closed in from bottom one to ceiling with two sash doors. The other side to have two doors under wide shelf, over to have shelves and sash doors. The sash in partition to be glazed with opaque glass.

Dining Room China Closet.—To have shelf 2 ft. 10 in. above floor as shown. Under to be a case of drawers. Over to be four shelves 14 in. wide and have two doors.

To be a panel slide where shown.

Hall Linen Closet.—Fit up linen closet with five broad shelves. The blank wall space to have two rows of cleats with hooks.

Clothes Chute.—To be built, where shown, of pine boards, with small lid or door at each story, to extend into laundry, with a stop at bottom.

Kitchen Sink.—To be soapstone, 22 x 42 x 8 in., deep, with grooved drip shelves at each end, pitching toward sink. Back to be 14-in. high, all parts cemented and fastened together in best manner. To have a case of three drawers under one end. On top of sink back to be a wood shelf 4½ in. wide, with a ½ x 4 in. base over.

Laundry Set Tubs.—To be soapstone and fitted up in laundry 2 ft. 10 in. from floor to top, properly supported on wood frame. Back of tubs to be finished over with a board 12 in. high, shelf and base. To have 1⅛-in. covers, framed together with two panels flush on top.

Bathroom, Lavatory and Water Closet.—To be fitted up in usual manner for open work. The plumber will furnish seats, tanks and brackets, but the carpenter will put all wood work in place.

Plumbing Fixtures.—Put up all necessary strips, cleats, shelves, &c., to run pipes on and covered to close in fixtures of material to correspond to finish of rooms in a neat and substantial manner.

Attic Tank.—Build a 40-gal. plank tank, made in usual substantial manner of 1½-in. pine. To be lined by plumber and placed in attic where directed.

Stairs.—Build main front stairs as per drawings, and details of same kind of wood as hall is finished with stringers 2 in. thick, not more than 18 in. apart. Treads to be 1⅛ in. thick, risers ⅞ in. thick, tongued and grooved together. Main post to be 7 in. square fluted, angle posts 5 x 5 fluted, and have molding at top like newel, but rails to connect to posts below cap. Balusters to be 1½ in., three to each tread or not more than 3 in. apart on centers. To have finished buttress around stairs and well hole.

Rear and attic stairs to be built of hard pine, post second story same as other stairs. Each flight to have hanging hand rail.

Cellar stairs to be made of dressed spruce.

Heating.

The building is to be heated with steam by the one-pipe system, with a standard make of radiators placed where shown on plans. The heater to be as selected and placed in cellar where shown, and connection to chimney by a heavy galvanized iron 8-in. pipe. The contractor will figure in $410 for this work.

Electric Work.

Bells.—There are to be three 3-in. box bells in kitchen, one to ring each from front and rear entrances and one from dining room. In dining room to be a combination floor push, with 6 ft. of silk cord and a pressel.

Incandescent Lighting.—Wire all outlets for lighting in best manner according to rules and regulations of the National Board of Fire Underwriters' Code and to the approval of local inspector.

To be wired by the two-wire system and run in porcelain tubes. To be wired for 16-cp. lamps, 104 volts.

To be switches as shown and as follows: One in first story hall to operate veranda, one to operate lower hall and one upper hall, one in dining room to operate lights there, one in passage to operate light in cellar, one in second story hall to light them and hall first floor. Switches to be N. P. flush switch. Main entrance switch to be of an approved make to conform to requirements. To have all necessary cutout cabinets, with all circuits plainly marked thereon. All wiring to be done so meter can be placed in rear entry. The contractor is to furnish all materials and labor for completing the work from point of attachment of the company's service to the future outlets.

Painting.

The painter is to furnish all materials and labor for the painting and finishing of the entire work about the

building. All to be the best of their several kinds. The painter is to consult the carpenter's specification for a more detailed description of the work.

The color scheme of house outside is the dark red brick first story, shingle work on body a Van Dyke drab, trimmings dark brown and roof a cherry red.

Outside Work.—All the exterior work of wood, iron, tin, galvanized iron, except otherwise specified, to be painted two coats of best paint, all colors as specified above. Putty stop all nail holes in finish, cracks, or other imperfections and shellac all sap, knots, &c., before painting. Outside of exterior doors to have three coats of paint or best exterior varnish as directed.

Side Wall Staining.—The shingles on side walls, gables and dormer windows to have one coat of pure linseed oil stain and one coat of pure linseed oil.

Roof Staining.—The roof of the entire building to have one heavy coat of pure linseed oil stain.

Inside Work.—All interior work must be well cleaned up before any finish is put on. All nail holes and other imperfections well puttied, matching wood as near as possible. Clean all paint or other finish from glass, marble or other places at the completion of the work.

Hardwood Floors.—The birch floors in rear parts to have a coat of oil and one coat of Berry Bros. liquid granite. The floors of vestibule, parlor, library, halls and dining room to have a coat of shellac and two coats of floor wax well rubbed and polished. The floors in second story and attic to have two coats of Quaker City floor dressing.

Finish.—The birch finish in dining room is stained a light brown, the birch in library and hall is stained mahogany, the two to have two coats of best alcohol shellac and two coats of standard varnish rubbed to an egg shell gloss.

The hard pine finish to have one coat of liquid filler and two coats of varnish. All to be left to an even and smooth surface.

The second-story finish to have a coat of shellac and two coats of varnish left even and smooth with a gloss.

The attic finish to have a coat of liquid filler and two coats of varnish.

The parlor to have a coat of liquid filler and three coats of paint left with an even enamel gloss.

The floors of closets, cellar stairs, doors and sash and finish in laundry to be painted two coats of paint.

The inside of sash in finished parts to have two coats of paint besides priming left with a gloss.

Painted Walls.—The plastered walls of kitchen, pantries, bathroom, lavatory and rear entry to have coat of sizing and two coats of paint.

All the above work to be done so as not to interfere or hinder any other workmen in any way. All finished floors must be protected with paper at all times and no interior work done unless the building is thoroughly warmed and kept warm.

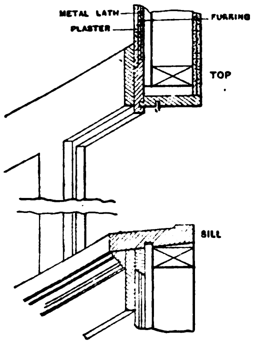
Gas Piping.

Provide and fit in place in best manner according to rules of Gas Light Company all gas pipes necessary to light the several parts of the building as shown. To be properly graded and fastened, leaving all ready to connect to meter at house and supply end by continuing supply from company's service in street to where meter will be placed. Lights to be placed about where shown.

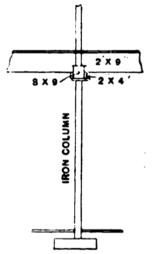
Plumbing.

This specification is intended to embrace all the labor and materials to complete the plumbing work of the entire building in every detail according to the plumbing ordinance of the city, and to the satisfaction and approval of the plumbing inspector.

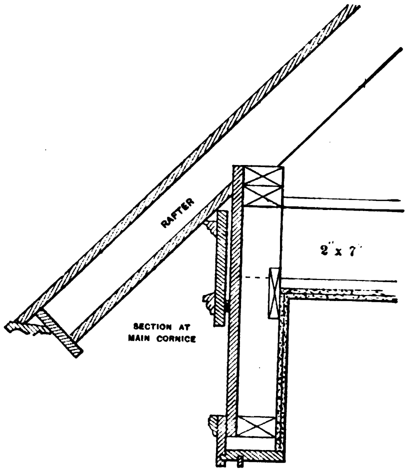
Soil Pipe and Sewer Connection.—Furnish, connect and run a 6-in. tile sewer pipe from street sewer to outside of house, from there run a 4-in. cast iron soil pipe with a running trap inside of wall with fresh air inlet and hand hole. To be continued along to and under fixtures up through at least 2 ft. and flashed tight at roof with heavy sheet copper. To have all necessary Y



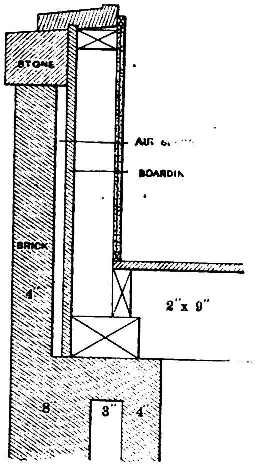
Section of Window Frame for Plastered Walls.—Scale, ¾ In. to the Foot.



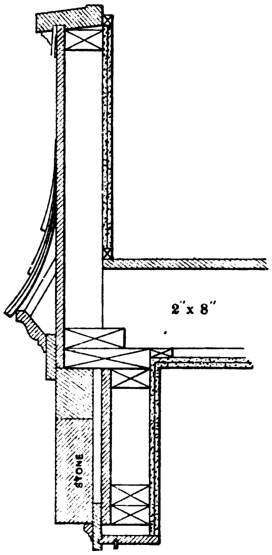
Detail of Columns and Beams in the Basement. — Scale, ⅛ In. to the Foot.



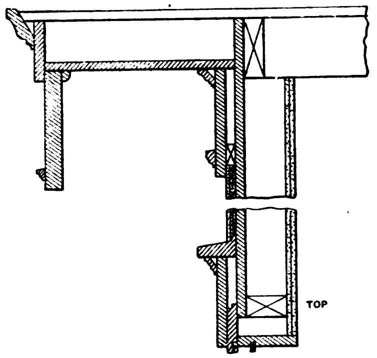
Detail of Main Cornice.— Scale, ¾ In. to the Foot.



Section through First-Story Wall. —Scale, ¾ In. to the Foot.



Section at Belt Course. —Scale, ¾ In. to the Foot.



Section through First-Story Wall. to the Foot.

Miscellaneous Constructive Details of Brick Veneer and Frame Residence in Worcester, Mass.

branches, bends, offsets, &c., to connect the several fixtures, too. All points to be made and calked with oakum and molten lead well driven in and properly calked.

Water Service Connection.—Furnish, connect and run from street service to inside of cellar a proper water pipe with shutoff inside of wall.

Provide and fit up the following fixtures in the places named, each and every one part to be complete in every particular and left in first-class working order:

Basement.—Fit up in basement a plain roll rim siphon washdown closet with tank, oak New York seat and cover attached to bowl with brass New York hinges, N. P. brass flush pipe, chain and oak pull with bolts. To have ½-in. I. P. size brass supply pipe taken in over the top. To have stop on supply.

Fit up in laundry a set of two-part Alberene or other approved soapstone washtrays with no back extending above tubs and have soapdishes. Each tub to have two-compression, two-arm bibb cocks set on back above tubs. To have 4-in. round trap under and 1¼-in. lead waste.

First Floor.—Fit up in lavatory one plain roll rim siphon jet water closet, with cabinet finish round cornered oak lowdown tank. To have oak seat and cover attached to bowl with heavy N. P. brass hinges, 1½-in. N. P. brass flush pipe, N. P. guide and rod with celluloid pull and brass floor flange. To have N. P. ½-in. I. P. size brass supply pipe to tank, with wheel handle compression stop all complete.

Fit up in lavatory one Standard Mfg. Company's 21 x 24 in. porcelain enameled lavatory with slab, bowl, overflow, back and apron all in one piece with concealed wall hinges, N. P. "Fuller" pattern faucets, supply pipes, "Keystone" waste and 1¼ in. brass S trap and pipe to floor, bowl 11 x 14 in., back 8 in. high. To have wheel handle compression stops on supplies.

Fit up in kitchen an Alberene or other approved soapstone sink 42 x 24 x 8 in., with back 12 in. high above top of sink. To have grooved drip shelf and a soap holder. All to be well fitted and fastened together. To have 5 in. brass strainer cesspool out and best nickel plated brass two-arm compression bibb cocks. Cold water to be hose bibb. To have 4 in. round trap and 1¼-in. lead waste.

Second Floor.—Fit up in bath room one roll rim syphon jet water closet with cabinet bent quartered oak low down tank with back. To have quartered oak seat and cover attached to bowl with heavy N. P. brass hinges, 1½ in. N. P. brass flush pipe, N. P. brass guide and rod with china pull and brass floor flange. To have ½ in. I. P. size brass supply pipe to tank with wheel handle compression stop all complete.

Fit up in bathroom one Standard Mfg. Company porcelain enameled bathtub with wide flat bottom and nickel plated No. 4½ "Fuller" double bath cocks and ½ in. I. P. size offset supply pipe and "Imperial" waste. Size of tub 5 ft. To have 4-in. round trap under foot connected with 1¼-in. lead waste.

Fit up in bathroom one Standard Mfg. Company percelain enameled lavatory with slab, apron, oval bowl, overflow and back all in one piece. To have concealed wall hinges, N. P. "Torrence" pattern "Fuller" faucets with china indexes, supply pipes with compression stops, "Keystone" waste and S trap with 1¼-in. N. P. brass pipe to floor, all complete. Size of slab, 20 x 24 in., bowl, 12 x 15 in., back, 12 in. high.

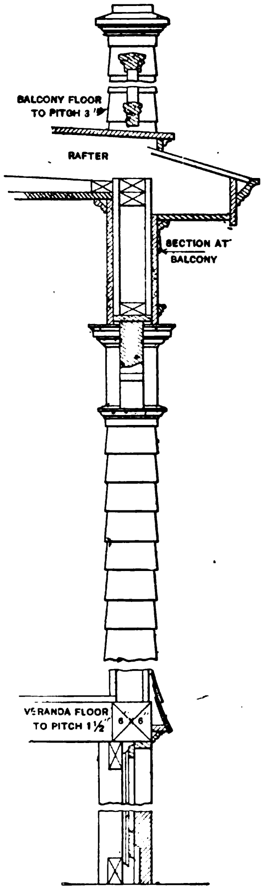
Attic.—Fit up one Standard Mfg. Company's porcelain enameled lavatory, with slab bowl, and all in one piece; no apron. To be supported on enameled iron brackets, N. P. waste, plug, coupling and stopper. To have compression faucets, brass supply pipes and 1¼-in. S trap and waste and vent to wall size, 16 x 19 in.; bowl, 11 x 14 in.

Hot Water Boiler.—Fit up in closet one full size and weight regular 30-gal. hot water boiler, with cast iron painted stand. To have all necessary couplings, cocks and brass expansion pipes complete. Supply to tank to be ½-in. brass. The hot water pipes between boiler and fixtures to be ½-in. brass. Connect boiler to range. Exposed pipes to be hung on adjustable brass hangers. Brass pipe to be standard or iron pipe size.

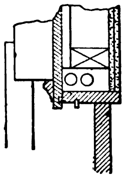
Tank.—Fit up in place and line with 14 oz. tinned copper a full size 30-gal. tank. To be supplied with water through best ½-in. iron size brass water pipe, ball cock and float complete and shutoff in cellar, to overflow into nearest practicable place with ¾-in. lead pipe.

Sill Cock.—Fit up in place where directed two ⅝-in. nickel plated flange and thimble hose bibb sill cocks supplied with water through best ¾-in. galvanized iron water pipe, with ¾-in. stop and waste.

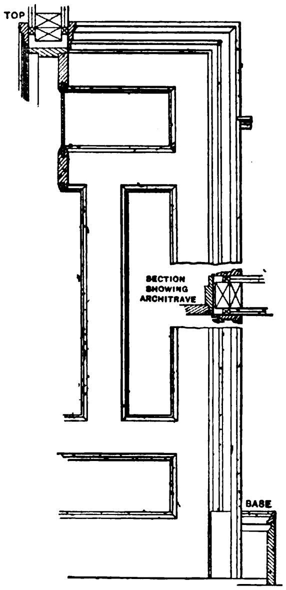
Supply Pipe.—Supplies in cellar to be ¾-in. galvanized iron pipe properly hung in place with iron hangers. The supplies above to be ½-in. brass, properly secured in place with brass clips, each riser to have a stop



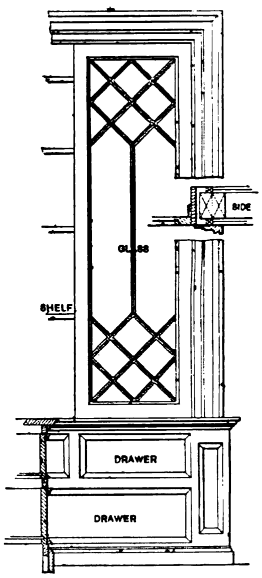
Details of Front Veranda.—Scale, ½ In. to the Foot.



Horizontal Section through Window Frame. — Scale, ¾ In. to the Foot.



Details of Doors on First Floor.—Scale, ½ In. to the Foot.



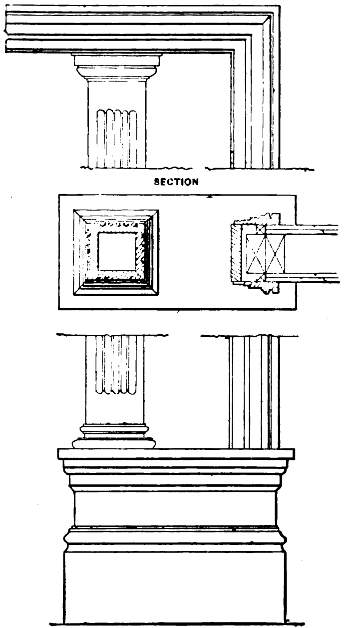
Details of China Closet.—Scale, ½ In. to the Foot.

Miscellaneous Constructive Details of Brick Veneer and Frame Residence in Worcester, Mass.

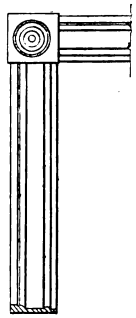
and waste in cellar. Each room to have its own supply separate from any other.

New York Y. M. C. A. Courses in Building Construction.

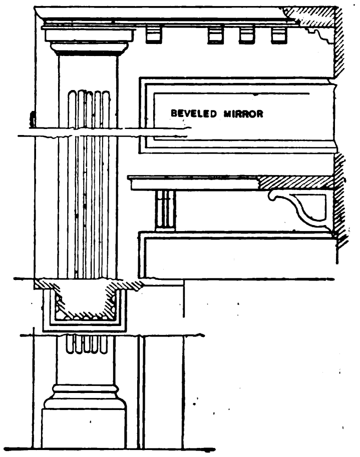
The remarkable activity in building construction in New York City during the past year, notably instanced by the fact that below Fulton street alone $50,000,000 is being expended on skyscraper construction, has led to important enlargement in the courses covering such work which were opened at the West Side branch of the Y. M. C. A., 320 West Fifty-seventh street, on the evening of October 2. At present builders are greatly needing men with knowledge of general building construction, estimating and drafting. The new classes will include thorough instruction in these branches. They are designed for superintendents, foremen, clerks, mechanics, and all those connected with such work who need training in order to rise to positions of importance.



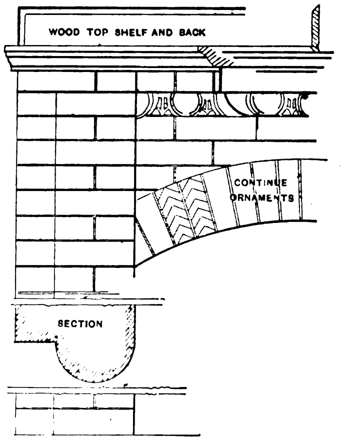
Details of Cased Opening Between Library and Dining Room.—Scale, ¾ In. to the Foot.



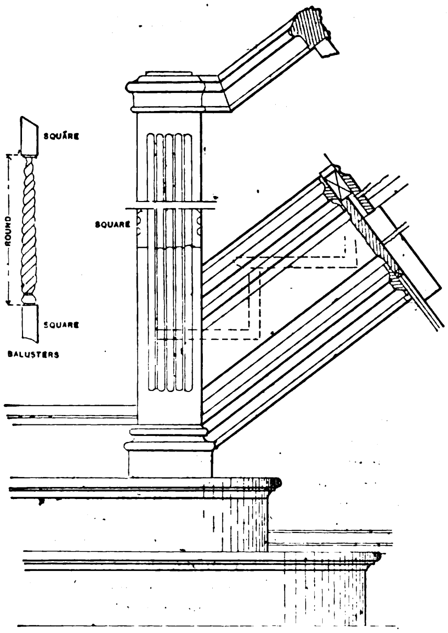
Detail of Trim in the Rear on First and Second Floors.—Scale, ¾ In. to the Foot.



Details Showing Half of Wood Mantel in Library.—Scale, ¾ In. to the Foot.



Detail Showing Half of Brick Mantel in Sitting Room on Second Floor.—Scale, ¾ In. to the Foot.



Details of Staircase in Hall, Showing Newel Post and Baluster.—Scale, ¾ In. to the Foot.

Miscellaneous Constructive Details of Brick Veneer and Frame Residence in Worcester, Mass.

Special attention will be devoted to the modern lofty steel skeleton building. A set of lectures with illustrations taken from actual building operations will be given to enable men to understand every part of its erection. These lessons will not be highly technical, but sufficient for general work. Groups of 20 men will be in charge of practical estimators, and will take up the work of the various building trades. In this practice work, plans and specifications of actual structures will be used to make the student competent to figure and work from plans on projected work.

The course will be under the direction of L. E. Jallade, architect, and an Advisory Committee, including J. M. Carrere of Carrere & Hastings, R. P. Bolton, consulting engineer of the New York Central Railroad terminal; Charles T. Wills, builder of the Tiffany and Gorham buildings. Other prominent architects, engineers and builders have promised to visit the classes and help the students.

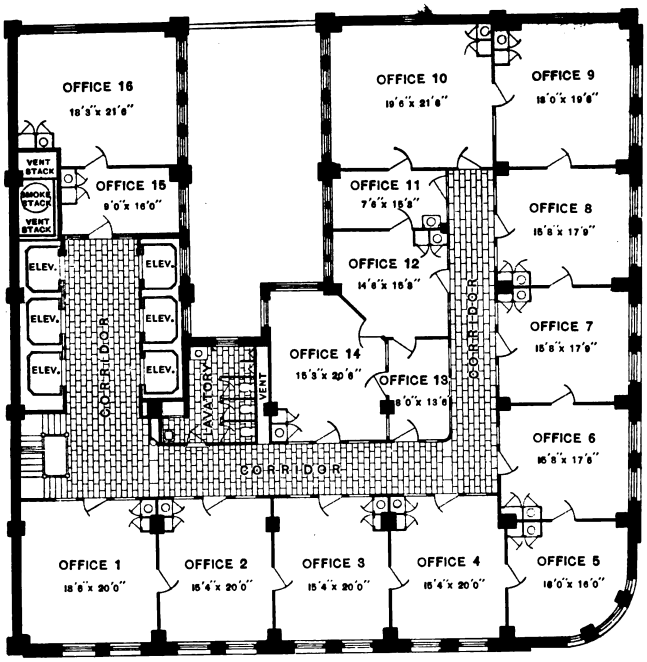
The instruction will include general building, excavating, shoring and underpinning, masonry, structural steel and ornamental iron work, carpentry, plastering,

sheet metal work, glazing, hardware and reinforced concrete instruction. The courses will continue for four months.

At the opening night of these courses addresses were made by John M. Carrere, the well known architect, R. P. Bolton, and Henry W. Hodge, consulting engineer for the Hudson Memorial Bridge.

Mr. Hodge said that New York, with its remarkable building operations, could take care of all the good engineers the schools could produce for years to come, but the rewards were not great and the beginnings meant simply "plugging away" at routine work. Many a college graduate went into engineering expecting a big salary from the start and found himself worth about a dollar a day. But he got experience.

Mr. Carrere, speaking for the architect, remarked that his position was difficult because he was the man between the builder and the owner. The builder, he declared, was generally much easier to please than the owner, because the builder knew more about the business. "The difficulty with the architect," he continued, "arises from the intangible nature of his work. He has apparently nothing tangible on which to base his estimates. Hence it is a hard task to make the owner understand what you are doing for him."



A Typical Floor Plan.

Pittsburgh's Latest Skyscraper.—The Union Bank Building.

Mr. Bolton talked for the plumber and the steamfitter, who, he said, "come in at the end of the building, and perhaps for that reason get the most kicks. But no one could live in a building these modern days if it were not for the plumber, the steamfitter and the elevator man.

◆

Pittsburgh's Latest Skyscraper.—The Union Bank Building.

(With Supplemental Plate.)

The subject of one of our supplemental plates this month is the new 22-story structure, including basement and subbasement, which is in process of erection by the Union National Bank at the corner of Fourth avenue and Wood street, Pittsburgh, Pa. The photograph from which the engraving was made shows the steel skeleton frame practically complete and the encasing masonry of plain gray granite under way at the lower stories. The building has a frontage of 84 ft. on Fourth avenue and 86 ft. on Wood street. The interior finish is of marble and mahogany and when completed the structure will rank among the notable office buildings of modern construction in the city. We present herewith a typical floor plan, and it may be interesting to state that in the entire building are 304 offices, in each of which is a lavatory and coat closet enclosed in a double mahogany cabinet, and a steel safe with steel interior cabinet work. Each floor is provided with ample toilet rooms and filtered drinking water.

The entrance to the building is on Fourth avenue through a wide, ample, marble corridor which will lead to the banking room and the elevators, as well as to the stairways. The staircases will be of white Italian marble and the balusters of bronze. The building will be equipped with six large high-speed plunger elevators, some of which will be used as locals to the 12th floor and others as expresses to the floors above. Two of the elevators will serve the basement and afford tenants direct communication to the safe deposit vault and the local conveniences, such as barber shop, &c. The elevator fronts will be of bronze.

The safe deposit vault, it may be stated, is 40 ft. 3 in. by 19 ft. 9 in. and is 9 ft. in hight. It is constructed of 34 plates of armor, aggregating a weight of 235 tons, and is said to be the second largest Harveyized nickel steel armor plate vault ever constructed.

On the first floor will be the banking room, which will be finished in a most rich and artistic manner. The ceiling will be 27 ft. high and the side walls will be of white Italian marble.

An interesting feature in connection with this building was that the 2200 tons of structural steel used in it were furnished by the Jones & Laughlin Steel Company, Pittsburgh, ahead of the time specified in the contract. When the crowded condition of the mills is taken into consideration this is a remarkable record.

The plans of the building were prepared by MacClure & Spahr, architects, Pittsburgh, and the general contractor is the A. & S. Wilson Company.

◆

Brick Bungalows.

An attractive type of residence architecture is being introduced in the city of Denver, Colo., in the shape of what is locally called "brick bungalows" of attractive style and finish. The prime mover in the undertaking is C. K. Ingham, who is having plans prepared for the first dozen, to cost on an average about $3500 each. The houses are unusually low, with broad and deep verandas as part of the house, and not merely as an incidental attachment. The materials for one of these cottages are cream brick set in bright red mortar and trimmed in red terra cotta. A roof with wide spreading eaves is also to be painted in bright red. A massive columned porch will adorn the front. Both within and without the red and cream tints will be carried out. There will be fireplaces in the principal rooms and the finish will be in warm tinted oaks. The ceilings will be paneled in oak, with the heavy beams of "mission" architecture. The bungalows will be of all sizes, ranging from those with four rooms and kitchen up to those accommodating families of half a dozen or more. Mr. Ingham as stated will build the houses a dozen at a time and intends to expend about $150,000 within a year on this class of homes.

◆

A safe rule to follow in the introduction of coloring matter into concrete blocks, says an exchange, is to use not more than one-sixth of color in a given weight of cement. If the color is mixed with the dry ingredients, being thoroughly turned and finally run through a fine screen before water is added to it, the resulting color in the blocks ought to be uniform.

CONSTRUCTING A LIME STORAGE BUILDING.

By James F. Hobart.

A PROBLEM recently worked out by the writer may possibly be of interest to parties who have to store and handle lump lime in bulk. It was required to unload several cars of lime in quite a short time, to store the lime for several days, and to deliver it over 100 ft. distant from the point of storage, the delivery to be as needed, a small storage hopper to be provided for storing one day's supply of the lime, and to deliver same in weighed units of 100 to 200 lb., as often as required—say at intervals of five to ten minutes, into a machine for hydrating the lime. It was therefore necessary that the lime be exposed to the atmosphere as little as possible, because lime air hydrated is never as strong as that hydrated without contact to the air. This is for the reason that during air hydration, or hydration by moisture contained in the air, more or less carbonic oxide is brought to the lime and instead of forming calcium oxide, calcium carbonate is formed. In other words, the more or less carbonic oxide always present in air carries back to the original condition of unburned limestone a certain percentage of the lime, thereby giving grounds to the assertion that "air hydrated lime is weak."

Fig. 1.—General View of Storage Building in Process of Erection.

Among other conditions imposed by the problem noted, was that the building should be of such character, and built of wood, that at some future time it might be changed into a brick building at little expense save for the cost and laying of the brick. In view of this limitation, and several others, such as first cost and building the structure in a very short time, it was decided to erect a wooden building with modified baloon frame, with temporary sills, a permanent roof, and weatherboarded in a peculiar manner which would allow the weatherboarding to be of rough square edge stuff, which when removed, was in condition to be put at once into a board fence 6 ft. high.

In Fig. 1 is shown the building in process of construction, the frame in particular being plainly indicated. The length and width of the building was such that each section of weatherboarding was just 6 ft. long, every piece of it being cut in the mill. In fact, it was all got out on the log saw, being sawn to a width of 10 in., squared up, and piled, and run past a railroad cutting-off saw which cut all the boards from an entire log at the same time. The weatherboarding was then "haked" up like staves, and allowed to season for three months before it was put in place in the building.

Fig. 2, which should be examined in conjunction with Fig. 1, shows the arrangement of the wall framing which is composed entirely of 2 x 4 in., 2 x 6 in., and 2 x 8 in. plank. The sills, which are to be sawn out in sections between the posts when the bricking is done, are composed of doubled 2 x 4 in., laid flatwise in a trench 2 ft. below the floor or ground line of the building. This is done to give the temporary building stability when empty, and to prevent the load of lime from bulging the walls when the building is filled to its capacity.

The frame is made of 2 x 6 in. and 2 x 8 in. spiked together on the corners, the 2 x 6 in. being used so that each face of the corners shall show 8 in. in width. A 2 x 4 in. is spiked into each corner and serves as a butting piece of the side and the end boarding, one lapping 2 in. on the corner posts, the other 4 in. on the remaining side of each corner post. Each side and end middle post is made up of a 2 x 4 in. and a 2 x 8 in. scantling, spiked together flatwise, the 4-in. piece standing on the sill, the 8-in. one being spiked to the side of the sill.

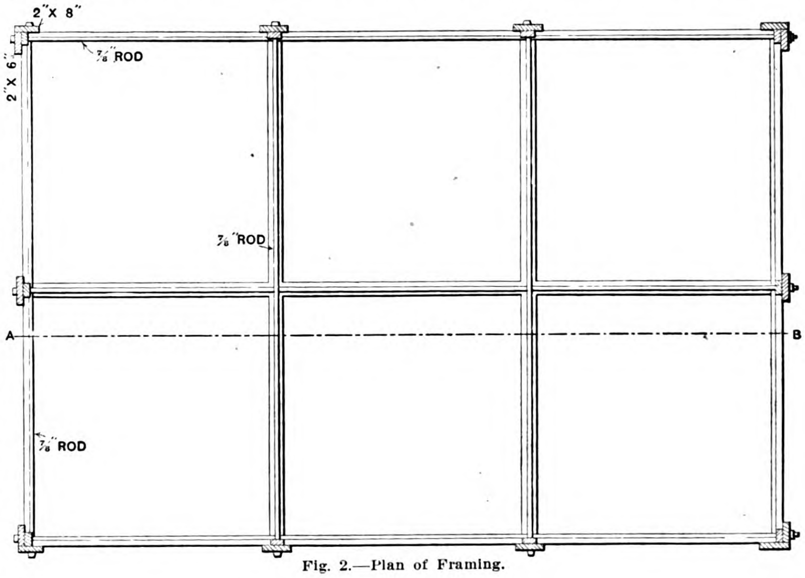


Fig. 2.—Plan of Framing.

Constructing a Lime Storage Buildng.

The hight of the building from the ground line to plate is about 20 ft. The plates are 2 x 4 in., laid flatwise and doubled, being locked at the corners and spiked to the corner and side posts. Two sets of ⅞-in. rods are run through the building, as shown in Fig. 2, in which, however, only one set or "layer" of the rods is shown. To withstand the pull of the rods when the building was empty, and to stiffen it, 2 x 4 in. timbers were put through the building underneath each rod, as shown. At the points of intersection, the timbers were halved together and spiked. As the timber used chanced to be long leaf yellow pine, there was no need of bolting the intersections of these timbers, or of bolting together the various members constituting the corner and side posts, but

had a softer wood been used bolting would have been necessary in case the holding power of spikes was less than it is with "Georgia" pine lumber.

The roof, as indicated in Fig. 1, is an ordinary pitch affair, the rafters being strapped with 3 x 1 in. strips, and corrugated iron nailed directly to the strips. As stated, the roof was intended to be permanent, therefore the gables were boarded and battened, windows being arranged so that the sash could be pivoted and worked from the ground, by means of sash-cords passing over pulleys.

When the building should be finished in brick (the concern being manufacturers of sand-lime bricks and desiring to make the bricks for completing the lime house), the section of sill between each pair of posts is to be sawn out and a 21-in. wall started two bricks inside the posts, two bricks outside, and one course of bricks between the posts, bonding all together in the best manner possible.

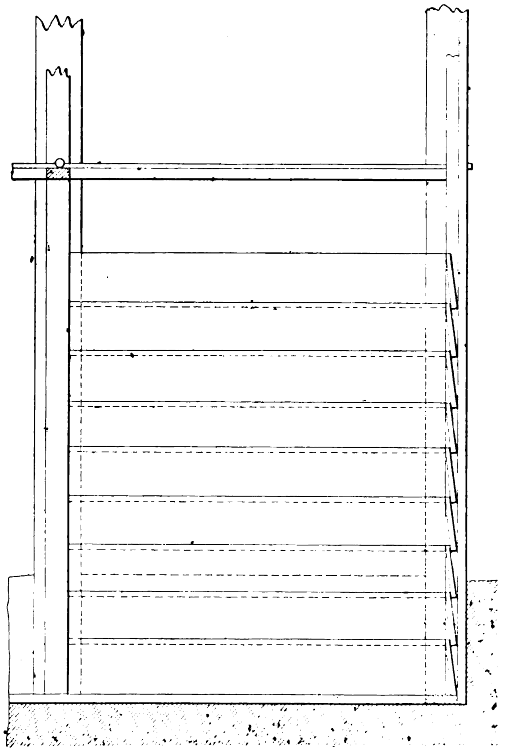


Fig. 3.—Partial Section on Line A B of Plan, Showing Arrangement of Wall Framing.

Constructing a Lime Storage Building.

After the wall has run up about 2 ft. above the ground line, a rowlock course of O G brick is to be laid around the outside and a similar course, or a course of plain bevel end bricks, laid inside, completely around the building, thus breaking the walls back, both inside and outside, to 13 in. thick, with which thickness, the walls are carried up to the roof and built inside and outside of the plate, which is allowed to remain in place permanently.

No windows are placed in any portion of the brickwork, all light that is necessary coming in through the two gable windows. This building was erected within 2 ft. of a railroad side track, and a light corrugated iron piazza roof was hung from the railroad side of the building, and the lowest portion thereof placed high enough to clear the top of a box car and the stack of a locomotive—about 14 ft. from the top of the rail. Railroad bridges are required to be 18 ft. in the clear above the rails, but the extra 4 ft. is to permit the brakeman to have about half a chance for his life when the train runs under bridges and the warning pendents have been worn out or broken off. Fourteen ft. in the clear was used as the hight of the roof on the track side of the building, and it was made wide enough so that it projected past the center of a car in order that no water might run down the side of the car toward the lime building in case a car had to be unloaded during a rainstorm.

The overhanging roof consisted of three pieces of 2 x 4 in. scantling, the upper one spiked to the building, the lower one supported by ¾-in. rods from the beam across gable of building. The middle scantling had very light braces placed underneath it. The corrugated iron was put on with carriage bolts, and a distance piece, the depth of a corrugation, was placed at each bolt. These distance pieces took the shape of strips of board equal in length to the corrugated iron sheets. A strip was laid in, underneath the particular corrugation through which the fastening was to be applied. This permitted the bolting to be done on one of the "up" corrugations, as always should be the case. A small washer was placed under the head of each bolt, and the nuts were placed inside so as to be protected from the weather. The bolts were passed through the distance strips mentioned, thus securing a very firm, light and strong roof.

The building was weatherboarded and braced in a very peculiar manner. The weatherboarding formed the bracing, and, as stated, was all cut to length at the mill, and was intended to be used as fencing after the building had been finished in brick. To put on the weatherboarding a start was made at the top, inside the outer post member. A pole the exact hight of the space to be filled with weatherboarding was cut and spaced off as for running the clapboarding used in New England. The spacing was made as near (not over) 9 in. as would come out fair in the distance to be filled with weatherboarding. Spacing was done at each of the four corners, on both sides of the corner posts, then the entire length of the vertical space was lined off to the marks made by snapping a chalkline from corner to corner.

In framing the building considerable care was taken to make the 4 in. member of each post of equal width from top to bottom. In fact all the inner members were sized to 4 in. and 2 in. respectively, in order that the weatherboarding might exactly fill the space allotted to it. The tie rods and the 4 x 4 in. horizontal struts were all so arranged that the weatherboarding just fitted snugly into the space allowed for it. A good deal of attention was given to this matter, as upon the end fit of the weatherboarding depended the bracing of the structure.

Everything being ready, a piece of the squared-up weatherboarding was driven underneath the plate and close up to the timber and fastened by a nail in each corner of the board. Another piece was then driven into place and brought even with the chalk line, 9 in. or thereabouts below the first board put in place. Thus each board was placed inside the next upper one, and outside of the next lower one, making a perfect rain shed as well as a practically dust tight joint between the ends of each piece of weatherboarding and the sides of the posts.

To make a tight joint between the upper and lower edge of adjacent boards two or three nails were driven through the edges of the boards, which lapped at least 1 in. These nails were then clinched slightly and served perfectly to prevent the warping away of the board edges.

The methods adopted for getting the lime into and out of the building were peculiar but very effective. A continuous bucket elevator was arranged in the middle of the side of building next to the track, and a chute so arranged that lime shovelled from the car would fall against the buckets of this elevator. In an ordinary bucket elevator the material is permitted to fall into a "boot," so-called, or a pocket in which the lower wheel of the elevator revolves. In the continuous bucket elevator the "boot" is dispensed with and the buckets placed close together, overlapping, in fact, so that no material can fall between the buckets.

The lime may be shoveled from car to elevator in the usual manner, but the better way is to procure a very large shovel of the kind employed in handling coal. A

¾-in. rope, 19 ft. long, is tied around the shovel handle, close to blade. In use, one man holds and guides the shovel, while another man pulls on the rope. In this manner enormous quantities of lime may be very quickly scraped or pulled from end of car to the elevator chute, and two men accustomed to the work can empty a car in less than one hour.

The elevator discharges the lime upon a chute, which, accordingly as it may be placed, discharges the lime either into the storage building around the elevator which carried it up, or, if the chute be properly set, the lime is directed upon a Robins-Webster belt conveyor which carries the lime quickly to the place where it is to be used.

The elevator in the lime house is inclined about 20 degrees from the vertical. In fact, elevators of this class do not load or discharge satisfactorily unless inclined at least the amount stated. The upper side of the elevator casing was made of clapboarding something the same as the weatherboarding of the lime house, but instead of being nailed the boards were notched and hung over lag screws placed in pairs, each 9 or 10 in., the entire length of the elevator leg. When it was required to use some of the lime stored in the building the chute at top of elevator would be set to the conveyor, some of the boards removed from the elevator leg at the level of the lime in storage, and the required amount of lime could be quickly shoveled or scraped into the elevator leg, from whence it would quickly travel to destination.

A small hopper was provided at the delivery end of the conveyor, the hopper in question holding one day's supply of lime. From this hopper it was necessary to draw the lime in amounts ranging from 100 to 200 lb. at a time. The amounts did not vary during the day after once being determined. In order to draw the lump lime from the hopper, which held about 4 tons, two boiler iron slides were arranged beneath the opening under hopper. The opening was about 12 in. square, and the sliders were 12 in. wide and 3 ft. 6 in. long. They were arranged opposite each other, and 4 in. apart vertically, the ways for each slide being long enough so that the slides could lap past each other their entire length.

An oil barrel was selected with strong staves and hoops, cut in two a little above the center and the smaller portion discarded. Trunnions were fastened to a stout hoop and bolted to the barrel section so that when filled with lime the section would balance. A forked scale beam was made of ¾ x 3 in. flat iron and suspended on knife edges and the barrel section suspended between the forks. The other end of the beam was loaded with bricks to the amount of lime desired, which was drawn through the slides into the tub until it balanced, whereupon the slides would be closed, one of which usually served to check the flow of lime. But, should a lump be caught between the upper slide and the bottom of hopper, then the other slide would be drawn under the upper one, stopping instantly the leakage of lime past the upper slide.

Levers were arranged to operate both the slides and the levers were brought together at a point convenient to the operator, and given a movement of 3 to 1 over the travel of the slides so that they could be very easily operated. The entire installation proved a complete success and left little to be desired. When the amount of the lime drawn into the tub balanced the bricks the slides would be set, the tub easily revolved by one hand, and all was ready for a new supply of lime to be drawn into the equal weight weighing device.

The elevator which took the lime from the car, or from the storage building, was driven by the conveyor which carried the lime from elevator to point of use. In this particular case the conveyor belt was 16 in. wide and carried on three-wheel carriers, delivering over 120 ft. from the elevator. By means of a pair of reversing pulleys the conveyor belt was carried around a 48-in. pulley placed directly upon the elevator head shaft. The elevator belt was 12 in. wide and fitted with continuous buckets. The 24-in. head wheel of the elevator made about 30 rev. per min. and would carry lime as fast as it could be shoveled upon the elevator by all the men who could get to work in the car.

Meeting of National Association of Builders.

After an interval of something like four years the National Association of Builders held a meeting at Atlantic City, N. J., the third week in September, with headquarters at the new Marlborough-Blenheim Hotel. The character of the meeting was altogether informal, the main purpose being to discuss matters of interest to the building fraternity, renew old acquaintances, have a social reunion and decide whether it was expedient to revive stated meetings at yearly intervals. Among other things considered was the question whether there was cause to alter the sentiment of the association in relation to the principles which had been enunciated in the past, and the result of this consideration may be stated as follows:

"The National Association of Builders reaffirms the open shop principles declared nineteen years ago, and calls upon builders everywhere to sustain them as the only sound basis for the employment of workmen. It also reaffirms its declarations in support of trade schools and the freedom of the American youth from restrictions of trades unions in the learning of trades.

"It again advises builders to insist upon the use of the 'Uniform Contract' in their engagements to construct buildings, as it affords effective protection against losses caused by obstructive action set up by trades unions, and also provides for the maintenance of the rights of all parties concerned in building contracts.

"In view of the fact that a movement is on foot to create a National Association of Builders' Exchanges, which aims to control employers in the building trades by copying the methods of trades unions, this National Association condemns such propositions and declares that any and all attempts to establish mandatory bodies either among employers or among workmen are fundamentally wrong, and lead inevitably to oppression. Employers are urged to avoid such complications."

On Wednesday evening, September 19, a banquet was held at the hotel and was a delightful affair.

It was finally decided to hold yearly meetings and that until otherwise ordered these are to be held during the month of September in Atlantic City. The president of the association is John S. Stevens, Philadelphia, Pa., and the secretary, William H. Sayward, 166 Devonshire street, Boston, Mass.

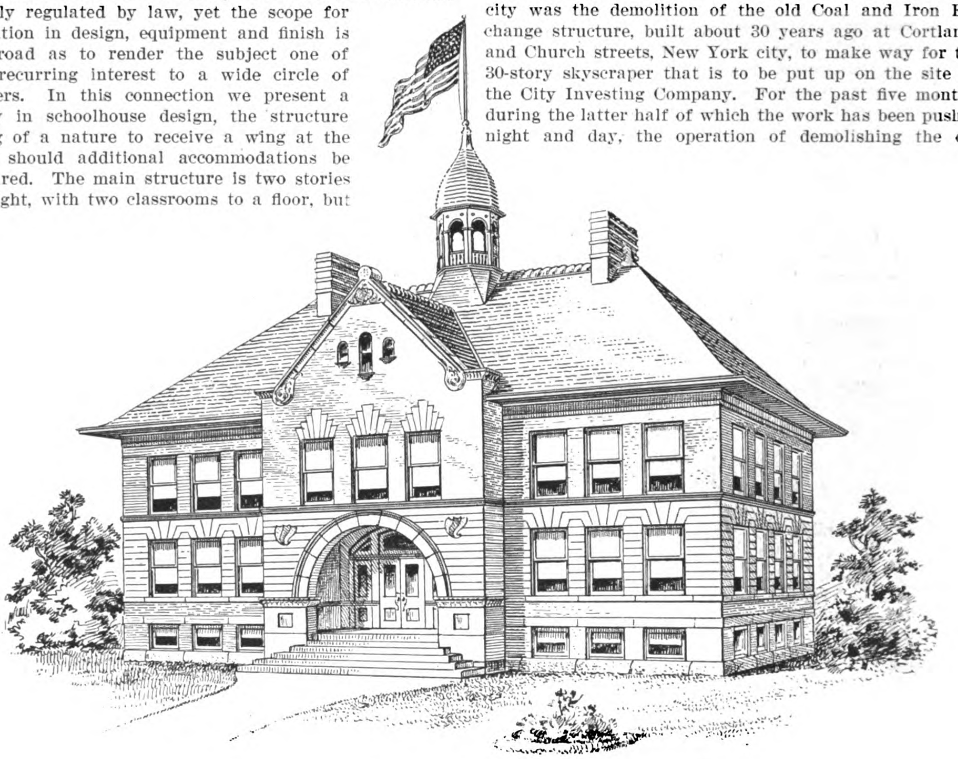
Electric Motors in Wood Working Shops.

More or less has appeared in the past in regard to the advantages of electric motors for driving machines in wood working establishments, and what has been said is ably supplemented by a correspondent in *The Wood Worker*, who points out the merits of this form of power as the results of experience in a large Eastern box factory. At the outset he states that in case of an accident to a machine it alone may be stopped. Should it be desirable to run that machine while the other machines are idle, or should the operator desire to start up the machine, he can do so at once. The power may be graduated according to work done on machine. There is no waste of power. Less belting and shafting are required, and that means a saving in repairs and material. There is no fire room to provide for, no steam pipes, chimneys, brick walls, engine foundations, boiler inspection, &c., to count on. Less space is required to install motive power. One man (electrician) will attend to all operation and repairs. The generator room may be elevated to command a general view of floor or floors. No smoke, oily floors, heat, jar, runaway engines, &c.

There are many other advantages which one cannot bring to mind until the opportunity arrives. Few care to go back to old methods after once making the change. Am unable to give any definite information as to cost of motor drives over old methods, but from what has been done and said hereabouts the cost of electricity cannot be excessive, or it would not be used. By strict economy it ought to be less expensive than steam, in the production of which there is always more or less waste.

DESIGN FOR A SEVEN-ROOM SCHOOLHOUSE.

THE planning of schoolhouses is always an important subject for consideration on the part of architects and builders by reason of the many factors entering into a solution of the problems of proper lighting, heating, ventilation, &c. The seating of the pupils with regard to the proper light to give the best results, the amount of air which must be supplied for each occupant of the room and the frequency with which it must be changed are points which, in these progressive days, call for more than usual attention. In many states these matters are largely regulated by law, yet the scope for variation in design, equipment and finish is so broad as to render the subject one of ever-recurring interest to a wide circle of readers. In this connection we present a study in schoolhouse design, the structure being of a nature to receive a wing at the rear should additional accommodations be required. The main structure is two stories in hight, with two classrooms to a floor, but the additional wing would give an extra room for each story and a third one for the basement, thus providing seven classrooms in all. The total seating capacity of the main part of the building is 200 pupils and of the wing 130.



Perspective View.

Design for a Seven-Room Schoolhouse.—M. P. Kellogg, Architect, Boulder, Colo.

The design is intended for execution in the smaller towns, although it would not be out of place in some of the more important cities. According to the specifications of the architect, M. P. Kellogg, Boulder, Col., the foundations are of heavy stone with broken ashlar facing above grade, while the main walls are of pressed brick. The roof is covered with shingles and has an ornamental cresting at the ridges. The basement is well equipped with sanitary accommodations, a store or playroom, as may be preferred, a furnace and coal room, &c. The first floor has two good-sized rooms, each having two entrances from the main hall, cloakrooms, &c. This arrangement enables the pupils who pass through the cloak rooms to obtain their wraps and then out by way of the main hall. The rooms on the second floor are arranged much the same. At the head of the main stairs is an office which can be used either for teachers or the principal of the school, as may be desired. The floors are double throughout, and between the rough and finishing floors is a layer of Cabot's deafening quilt. All finish floors are of ⅞ x 3 in. quarter-sawed Texas pine. Each schoolroom has a paneled wainscoting 2 x 6 in. high, above which are the blackboards. All interior woodwork is of Texas pine stained and varnished. The various rooms are intended to be heated by hot air furnaces in combination with a ventilating system.

A Difficult Building Wrecking Operation.

What has probably been one of the most difficult building wrecking jobs, at least in recent years, in connection with the rebuilding of the downtown section of the city was the demolition of the old Coal and Iron Exchange structure, built about 30 years ago at Cortlandt and Church streets, New York city, to make way for the 30-story skyscraper that is to be put up on the site by the City Investing Company. For the past five months, during the latter half of which the work has been pushed night and day, the operation of demolishing the old building has been in progress, and at the time of writing it is practically completed except that much of the débris remains to be carted away.

In demolishing the building structural details and quantities of material have been revealed that have astonished even those who were familiar in a general way with its massive construction. Some of these figures will doubtless be of interest to builders in other parts of the country.

The stones in the Cortlandt and Church street fronts were not merely a veneer, but extended clear through the walls. The smallest of them weighed 4 tons and the largest 8 tons.

Some of the supporting piers were 10 ft. thick, and they average 7 ft. thick all around the building. The footings were 7½ ft. deep by 8½ ft. wide. Throughout the lower floors were brick arches of nearly 14 ft. span, with a width of over 4 ft. and a depth of 2 ft. Even at the extreme top of the building the outer walls were 2 ft. thick. The structure contained about 3,000,000 bricks.

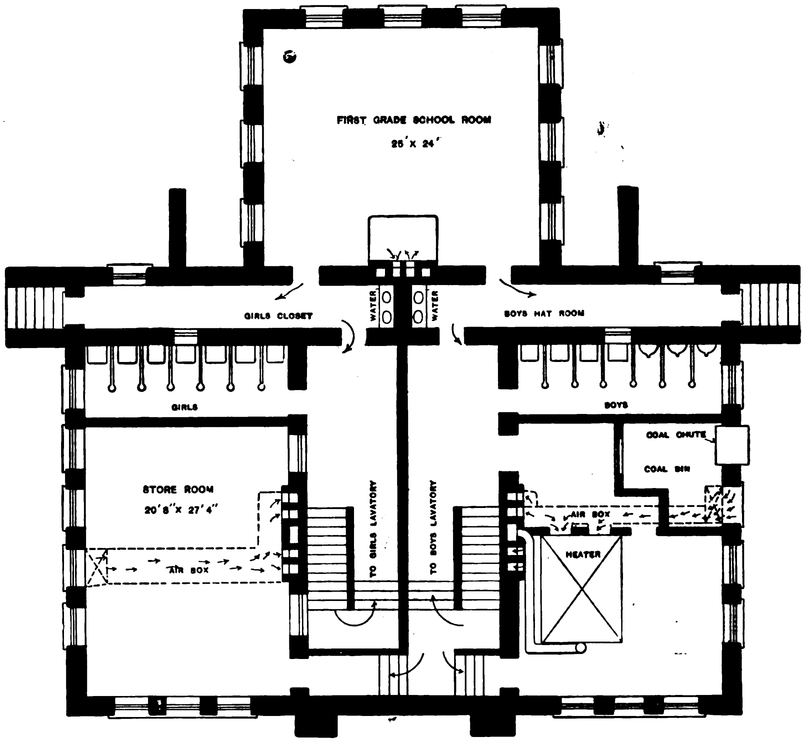
Eight hundred tons of iron have been taken out of the building—all of it in the shape of floor beams, no iron columns being used in the structure.

Floor arches were 10 and 12 in. in thickness, of terra cotta and plaster, and capable of sustaining over 300 lb. to the square foot. As the building was being taken down rubbish accumulated on the second floor to the

amount of about 2000 loads, but the floor apparently could have carried 2000 loads more without feeling the strain very much. Marble was used extensively throughout the building for stairs and wainscoting.

There has been employed in the work of tearing down the structure a day force of 125 men and a night force of 50 men. They have hammered and picked and pried at the old walls, but in some cases their efforts have been useless, so that 150 lb. of dynamite have also gone into the job to loosen up sections of wall and dislodge some of the 8-ton stones.

Much of the material removed can be used again. Many a tenement house wall will be "filled" with brick from the Coal and Iron Exchange—perhaps wholly built of it, while the immense stones will be recut and used in smaller work.



Foundation.—Scale, 1-16 In. to the Foot.

Design for a Seven-Room Schoolhouse.

Modern Methods of Wood Staining.

Among the papers presented at the fifteenth annual convention of the Master House Painters and Decorators' Association of Ohio, held in July at Cedar Point, a beautiful summer resort lying within the city limits of Sandusky, was one on the above subject by W. D. O'Connor of Youngstown. What the author had to say was of such general interest that we present copious extracts herewith: Stains of all colors, shades and kinds are being put on the market, which work and look beautiful on small samples, but which we have more or less trouble with when we come to use them in our every day work. What is wanted is a stain that can be used on large surfaces and that will stain evenly and not show laps.

Some of the effects produced to-day on furniture are almost impossible to secure on the trim of a residence, unless the woodwork is fitted first and then treated in a room prepared for the purpose. This being the fuming process, which is done by exposing the wood to the fumes of ammonia, acids, nitrate or silver, or other chemicals, according to the effect wanted. These can be imitated by the water stains, which can be made from various chemicals, dyes, &c.

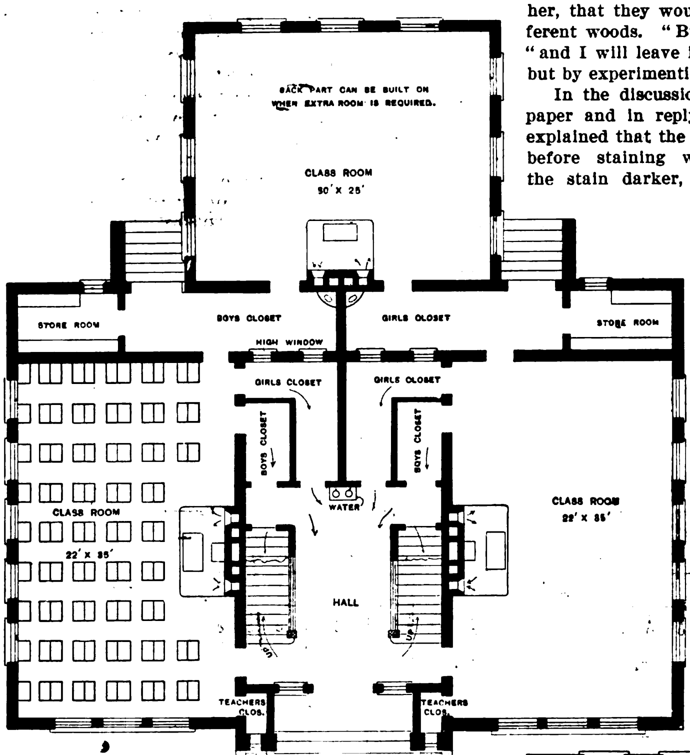
I have had excellent results from the stain powders made by the Barrett-Lindeman Company, using a proportion of stale beer instead of all water, the only objection being that they raise the grain more or less. I have also had very good results from Diamond dyes, so long used to dye cloth. Alcohol used as a solvent for your colors makes a very good thing to stain with on small surfaces, but unless handled by an expert you are apt to have laps in the work on large surfaces.

Among a number that are on the market the best that I have tried are the ones put out by the Sherwin-Williams Company. These are not apt to show laps if handled right. So far I have only finished over these with shellac and wax.

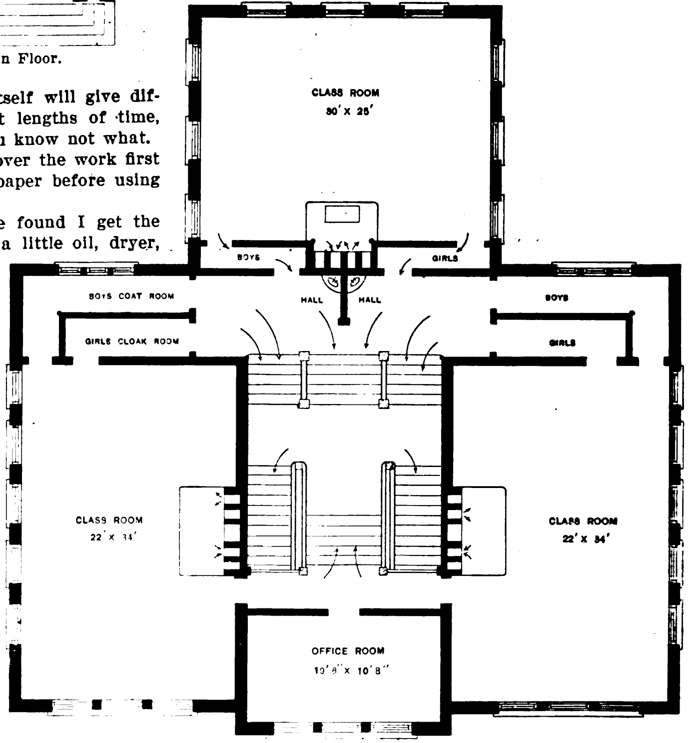
Some of the stains on the market I find it hard to varnish over and get good results. Varnish will not dry, or if it does at first seems to soften up afterward, and not knowing what the stain was composed of you are up against it, so to speak.

The old-fashioned oil stains can be used on oak or ash if not too dark effects are wanted. Asphaltum can be used to advantage, but a very pure article must be used, especially in making the golden oaks, to get the proper tone. The very white flakes in some of these are made by taking a pencil and shellacking the flake, then staining, after which sandpapering until the flakes feather out, when it is filled and proceeded with as usual. I have found that a good many effects can be obtained ~~with~~ the use of a bichromate of potash solution of different strengths, in combination with different colored fillers on the oaks. It is also good to darken mahogany and cherry. Permanganate of potash can be used to a good reddish brown effect. A good bluish gray can be got on oak with a solution of sulphate of iron, depending on the strength used and the amount of tannic acid in the wood. Lime water can be used to get the old effects on mahogany and cherry, it aging the wood very fast, but remember to always wash over with vinegar or a weak solution of acetic acid after using an alkali.

Different woods will give different results with the



Main Floor.



Second Floor.

Design for a Seven-Room Schoolhouse.—Floor Plans.—Scale, 1-16 *in. to the Foot.*

same stain, as also will wood that has been newly cleaned be different from that which has stood for some time. Wood that has been wet will stain darker than that which has not, and your stain itself will give different results after standing different lengths of time, due to chemical changes caused by you know not what.

It is sometimes a good idea to go over the work first with clear water and when dry sandpaper before using the stain.

On yellow or Georgia pine I have found I get the best results with a stain made with a little oil, dryer, the necessary colors and thinned with benzine, wiped off after standing a sufficient time. In fact, when using this class of stain always wipe off clean if you want a clear effect, then if you have not the exact color you want you can sometimes get it by using a thin glaze on top. Sometimes to get certain effects on mahogany or when imitating it on other woods I do this when using a water stain, after I have shellacked. It must be carefully applied and blended, so as to be even, and of course must be perfectly transparent, so as not to hide the grain of the wood. I have also stained first with a water color and when dry with an oil stain to get the effect I was after. The main thing is to get the desired color without destroying the beauty of the wood itself. If anything you should enhance it.

By using judgment you can get out of most any tight place. For instance, I had a hall and vestibule, cypress finish, poplar doors, with cherry sash upstairs. Down stairs cypress finish, cherry doors and sash, oak treads on stairs and all of the vestibules. The owner wanted a brown stain similar to No. 254 English oak wood tint, made by the Chicago Varnish Company, as the architect had told her it would be the thing. I tried same and found of course, as I had told her, that they would not come out the same on the different woods. "But they must be the same," she said, "and I will leave it to you." It was a hard proposition, but by experimenting a little we were able to satisfy her.

In the discussion which followed the reading of the paper and in reply to various questions Mr. O'Connor explained that the reason why he put water on the wood before staining was that wetted wood would take the stain darker, and that wetting raised the grain, giving a chance to sandpaper off the little grains before staining. Using a portion of stale beer prevented the grain from raising too much.

◆

As INDICATING the tendency of business enterprises toward that section of New York City located about Fifth avenue and Thirty-fourth street it may be stated that Architects Buchanan & Fox have just filed plans for an 11-story loft and store building, which will be erected on the plot numbered 33 and 35 West Thirty-fourth street, to cost about $350,000. The site was secured in April last at a cost of about $1,000,000, thus bringing the total improvement in the neighborhood of $1,500,000. The contracts, which have been awarded, call for the completion of the building by July 1, 1907, and the cloak firm for which the structure is being erected, Oppenheim, Collins & Co., expects to be in possession in time for the fall opening in September next.

KNOTS, HITCHES AND SPLICES FOR THE BUILDING MECHANIC—IV.

By Edward H. Crussell.

THE most complicated knot that we have yet examined is represented in Fig. 51. It is known as a jury knot, or jury mast knot. It is also called (when the ends B and C are spliced together) "a true lovers' knot." When rigging a jury mast the head of the mast is passed through the center of the knot (A), B and C are used as back stay, while the side and fore stay are fastened to the three bights D, C and F with the double sheet bend. It does not matter if the ends B and C are spliced together before the knot is made, so that we are able to take a small sling, form this knot in it, slip it over the end of any pole that we may be intending to use as a temporary derrick, and use it in place of the mast ring to which to fasten the guys, though personally I prefer to use two ropes, each long enough to make two guys, and attach the center of the rope to the top of the pole by means of the clove hitch as already explained. To make this knot form three half hitches in exactly the same manner as explained for the clove hitch, shown in Fig. 29, laying each hitch as it is made on top of the one preceding it, like Fig. 52. Now pass the rope marked 1 under 2, over 3 and under 4. Then pass the rope marked 2 under 5 and over 6; hold 1 and 2 in the hands, take hold of 7 with the teeth and pull. Make the bight 7 of the proper size first, as the others, 1 and 2, being directly connected with the ends, may be easily adjusted afterward. A round ball can be slung with the knot shown in Fig. 51. Splice the ends B and C together, put the ball on the center A and bring the four bights up around it.

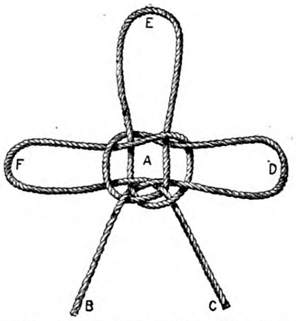


Fig. 51.—Jury Knot or Jury Mast Knot.

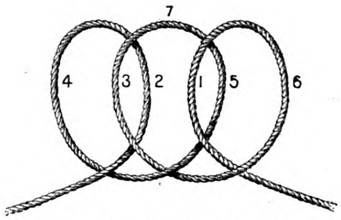


Fig. 52.—Three Half Hitches Used in Making Jury Knot.

The trick knots, of which there are a number, are of little practical use, though I have thought that this article would hardly be complete without at least one of them. The trick is generally not so much in the knot itself as in the manner in which it is tied. The simple overhand knot can be tied as a trick knot, as also can the double bow knot. The knot shown by Figs. 53, 54 and 55 is perhaps as good a trick knot as any. Commence by forming a bight in the cord, then bring the top of the bight down so as to form two other bights, as shown by Fig. 53; cross the bight on the right, over that on the left, as indicated in Fig. 54, and pass the part of the cord marked A down between the other two cords and up through B, at the same time passing all of the knot through C, when you will arrive at the knot shown in Fig. 55, which we have seen before under the name of the fisherman's eye. To people that are afflicted with the complaint known as "butter fingers," the practice of this knot is recommended.

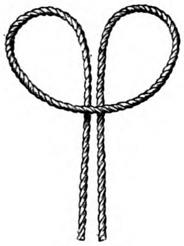


Fig. 53.

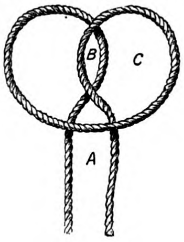


Fig. 54.

Fig. 55.

Figs. 53, 54 and 55 Show a Trick Knot and Method of Tying It.

Among the many ornamental knots, with which we have nothing to do in this article, I have thought that perhaps an explanation of the working of a "Turk's head," which is the most ornamental of them all, would prove interesting. It is generally worked with small cord, around a larger rope or spar, and very neat ferrules may be formed with it on the crops of riding whips or the handles of parasols. For this purpose a small mohair boot lace is good, the tags on the ends giving material assistance in working the knot.

When using cord without tags a crochet hook or small button hook may be used to work it through. Commence the knot by forming a clove hitch around the article that is to be ornamented, as shown in Fig. 56. This must be left slack, just how slack you will only be able to tell by experience. The end A is the working end and must be left long enough to form the knot—about 12 times the circumference of the stick. Take the strand B, pass it up and over C and pass the end A through the bight that C thus forms, then take the strand C, pass it up and over B and pass the end A through the bight that B thus forms; and so twist one strand over the other and pass the end A through till you get round the stick to the starting point, the number of twists depending upon the size of the stick and the size of the cord with which the knot is made. When you get around to the commencement lay the strand with which you are working alongside D and follow D around the stick again, being careful to keep A close to D, and always on the same side of it. Work the strand A around the stick in this manner until the knot is tight. Three times around is the usual number and Fig. 57 shows a three-strand Turk's head. The ends of the cord finish off under the cross strands and after the knot is made neither start or finish can be seen.

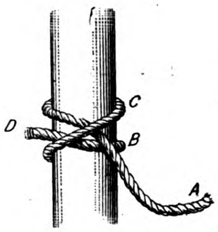


Fig. 56.

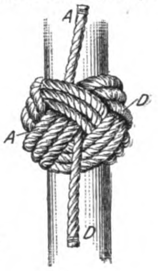


Fig. 57.

Fig. 56.—Method of Starting Turks Head.
Fig. 57.—Three-Strand Turks Head Completed.

Knots, Hitches and Splices for the Building Mechanic.—IV.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

NOVEMBER, 1906.

Profits in the Building Trade.

The large number of mechanics' liens which have been filed recently in New York City calls attention to the fact that the risks in building trades are large and that the profits accruing are not proportionate to the hazard of the undertaking nor the knowledge requisite to carry the operation to a completion. In other lines of trade where the business is considered a venture, as in mining, it is universally recognized that the profits when received should be considerably more than those ordinarily accruing from business ventures. It appears that conditions in the building trades are gradually growing worse, the risks becoming greater and the profits less year by year. The great variety of conditions which may affect a building operation are too little understood; seemingly insignificant events in a remote part of the country may entirely wipe out the profits and cause a considerable loss on a building contract in almost any city. A strike among coal miners in one locality may so retard the production of steel that the fabrication of a building which should have been up and inclosed by September is hardly begun in February. In the meantime the price of materials may have changed or, worse still, since it is possible to cover future requirements by buying ahead, the labor situation may be entirely different when it comes time to install the work. It is true that action has been taken any number of times to secure conditions which would be for the betterment of the trade, but this has been hampered by the influx into it of a large number of newcomers who can see nothing ahead but marvelous profits, and who, in order to secure a share themselves, compete so keenly that some operations are but little more than a gamble. So deplorable has the condition become that many reputable builders and contractors are refusing to take contracts on the speculation class of buildings, or are contenting themselves with the more prosaic and more profitable work of repairing only.

The Selection of a Vocation.

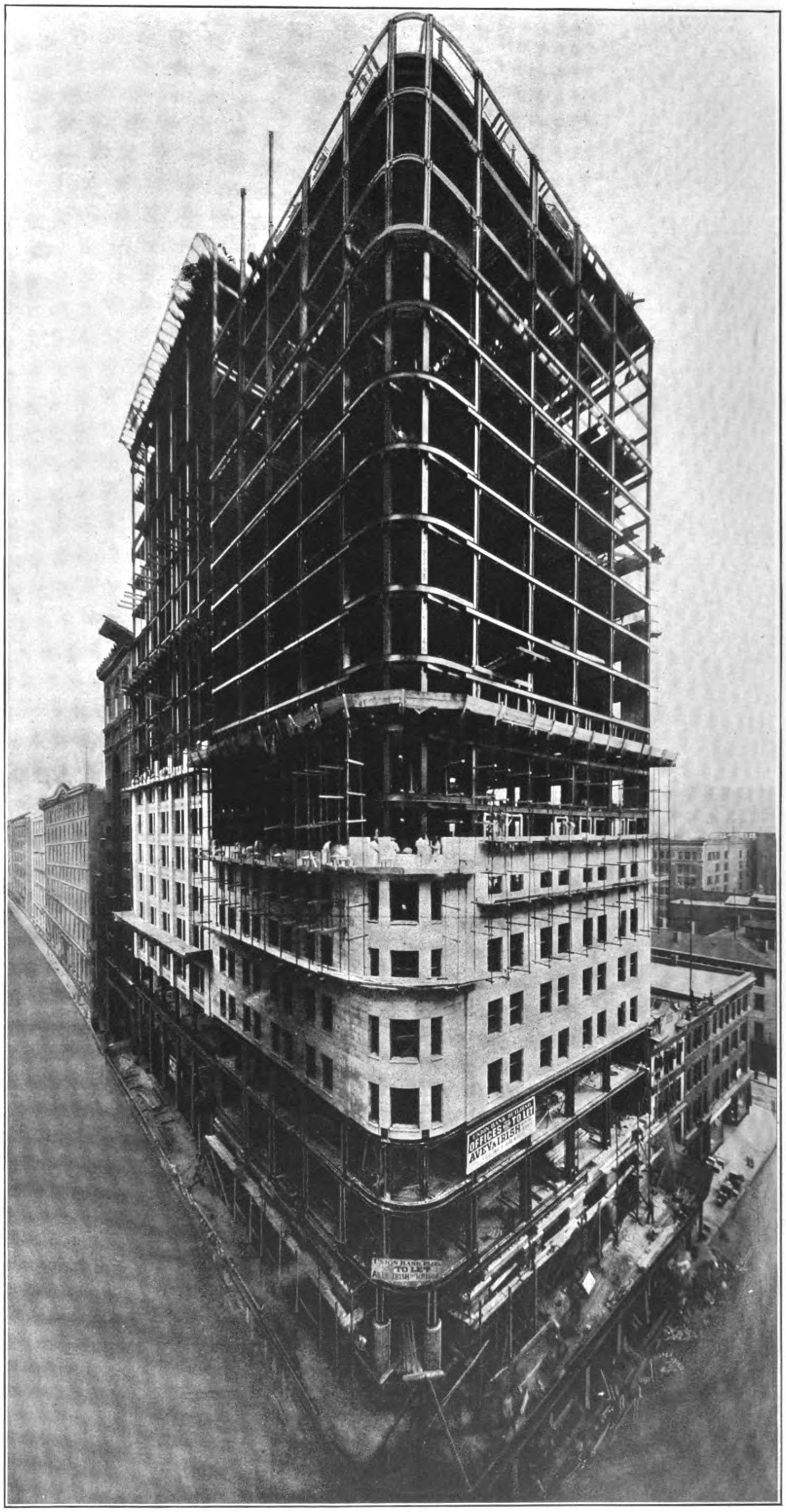
With the completion of preliminary education and with the advent of the trade school season there is naturally a large proportion of the youth of the country that is confronted with the necessity of selecting a line of work which shall be productive of the most satisfactory results financially and otherwise. The gravity of the situation is usually appreciated, if indeed it is not exaggerated, but there is no question that the tranquillity of succeeding years has much to do with engaging in a field that can be mastered and made congenial. It is said that there is no well balanced man who does not have a hobby, and assuredly that man has a bright future whose life's work or that proving his mainstay is also his hobby. The men who have made names for themselves have been favored with a bent that industriously followed has been a leading factor in their achievement of fame. Their liking for their work is so great that they are impatient when not busy at it, and, as anecdote has often told us, had rather do their work than eat or sleep. Those of us who are not so fortunate in that our hobbies are unproductive or are expensive, so far as the supply of bread and butter is concerned, must resign ourselves to our fate and select what we feel can at least be made congenial and gain for us an honorable livelihood. Of course in thus disposing of our hobbies we are measuring success from the financial standpoint, because the procuring of the wherewithal is a leading incentive to educating ourselves, though the real measure of success and ultimate happiness must take into account a good number of other considerations than mere income, however important that may be.

Learning a Trade.

If the youth feels confident with respect to his capabilities in a certain direction he needs no assistance in making his selection. If he believes that he has some mechanical genius, but a taste for something for which there is only a restricted market, then unless he has something more than a remote chance of realizing his greatest desire he can, it would seem, safely undertake to learn a trade. The inborn skill with the hands of a man who is mechanically inclined makes it possible for him to acquire proficiency with more than one trade if needs be, which is saying that the make-up of the mind of the skilled worker would probably admit of his safely selecting any one of a wide number of trades. Such being the case, he can decide on that branch of work which is likely to prove most engaging or the most promising in the way of recompense. Certainly it will be admitted that those who forge to the front and become foremen and responsible, trustworthy workers are those who have proved industrious, persevering craftsmen, who have a fondness for their work and a proper esteem for its honorable position. For the man without a special bent in ability to use the hands there is perhaps some question. With him skill with the hands is apt to be a relatively slow development, though he will doubtless with untiring persistency sooner or later gain proficiency. There are probably many such men who have reached places at the top. Whether the handicraftsman can also become the master of his trade, in the sense of being an employer making contracts and executing work, depends more than is apparently fully understood on another feature of the mind. The head that can manage a business in all its branches is not necessarily also the head that can handle all the practical details of actual work. This indeed is a question that is being very widely considered among masters, and is an extensive one at that. Suffice it to say, however, that the master is fast realizing that he is a business man first and a handicraftsman second.

St. Louis' New Skyscraper.

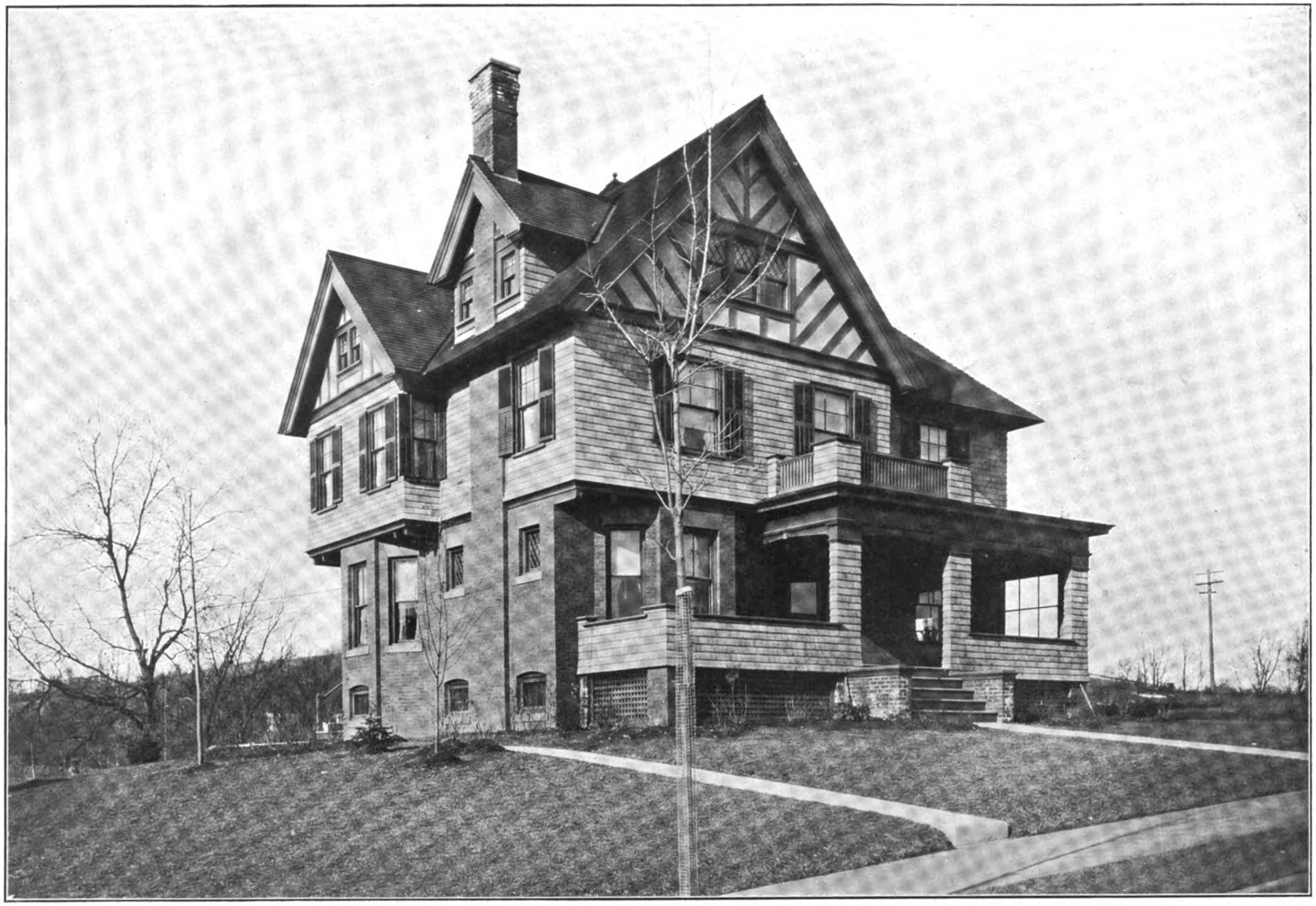
Among the many improvements which mark the unusual activity prevailing in the building line in St. Louis and which will be a notable feature of the architecture of that city is the 19-story office building to be located at Broadway and Olive street. The site is diminutive for a structure of this altitude, measuring as it does only 28 x 100 ft., and which in its style of architecture will closely resemble the well-known Trinity Building in New York City. The Broadway façade will be in vitrified white terra cotta, the first story being a combination of terra cotta and glass. All windows and frames will be of copper and wired glass. The jambs will be in marble and the casing, doors and door frames of metal. The stairway will be of steel and fireproof tile, completely



PITTSBURGH'S LATEST SKYSCRAPER — THE UNION BANK BUILDING

MacCLURE & SPAHR, Architects

Supplement Carpentry and Building, November, 1906



A TWO-STORY FRAME AND BRICK VENEERED RESIDENCE RECENTLY ERECTED IN WORCESTER, MASS.

JOHN P. KINGSTON, ARCHITECT

Supplement Carpentry and Building, November, 1906

incased with wired glass, with iron fireproof doors at each landing, the finish of which will be in bronze. In fact there will be no wood in the building except that which the tenants may install in the way of office furniture. There will be three high speed elevators, and there will be standpipes running up from the basement with connections at each floor for use in case of fire. The main entrance will be 15 ft. wide, and it as well as all corridors will have black African marble base, with white Italian marble wainscoting 15 ft. high, with white Italian marble floors. The new structure will be known as the La Salle Building, and will cost in the neighborhood of $1,000,000. Contracts for its construction have been awarded and call for its completion within six months from the time the demolition of the buildings now on the site begins.

◆

The Late Stephen Mott Wright.

A life of usefulness, well spent, was suddenly ended when Stephen M. Wright passed away on Saturday, September 22, at his home in Glen Head, Long Island, N. Y. His death came as a great shock to his multitude of friends and associates, for up to the day previous he had appeared in his usual good health and as late as the evening of Wednesday, the 19th, had spoken most acceptably at the banquet of the National Association of Builders in Atlantic City. His death was due to hemorrhage of the bowels.

He was born in Jericho, L. I., August 16, 1841, but his education was acquired in the public schools of New York City. At the age of 15 he began his business career in the store of his father, Daniel Dodge Wright, who was one of the most successful hardware merchants in the city, and from whom he received such a thorough training that by the time he had reached his majority he was fully equipped for the line he had chosen.

In 1865 he succeeded his father in the hardware business, which he carried on until 1887, when he retired from active business life. After that he devoted his time and his energies to the promotion of various public and benevolent enterprises, and was especially identified with the material progress of the building industry of New York City.

For the 12 years from January 1, 1885, to December 31, 1897, he was secretary and afterward vice-president of the General Society of Mechanics and Tradesmen. He served the Building Trades Club as secretary and treasurer almost from its organization, and in recognition of which he was presented in 1894 with a bronze group executed by Gaudez of Paris. He was an active and influential member of the Mechanics' and Traders' Exchange, of which he was secretary for a number of years.

He was for several years the New York representative in the Board of Directors of the National Association of Builders and for seven consecutive years he was elected a delegate to represent the building industry of New York in the conventions of the National Association.

During the Washington Centennial celebration in New York in 1889 Mr. Wright was secretary of the conference having charge of the Civic and Industrial Division of the parade, and in recognition of his services in connection with that affair he was publicly presented with a bronze medal.

When in 1891 the builders of New York entertained the members attending the convention of the National Association of Builders held in the metropolis, Mr. Wright was made secretary of the Committee of Arrangements and had entire charge of all the details incident to the entertaining of nearly 1000 persons for an entire week. To prepare for the various details of this affair required nearly a year of his time.

He was secretary and treasurer of Webb's Academy and Home for Shipbuilders at Fordham, an institution in which he took the deepest interest, influenced, no doubt, by the fact that his grandfather was a leading shipwright in New York. He was a trustee of the Dry Dock Savings Bank from 1877 to 1894.

Mr. Wright was for many years one of the "bright and shining lights" in Free Masonry, being a member of numerous lodges and chapters, while the patriotism and military ardor of his ancestors was manifested in him to a marked degree from early life up to the time of his death. He spent nearly 10 years of active service in the National Guard, State of New York, enlisting in Battery G, First Regiment of Artillery, October 25, 1864, was made Regimental Adjutant May 27, 1868, and presented by his former associates in Battery G with a beautiful gold-mounted sword. The regimental organization disbanded in December, 1869, and on February 5, 1870, he was assigned by Governor Hoffman to the position of First Lieutenant of Separate Battery Light Artillery and continued until honorably discharged January 4, 1872. Lieutenant Wright was in command of the battery during the famous "Orange riot," July 12, 1871, and was complimented in general orders by General Shaler on the efficient manner of his handling this important arm of the service on that day.

Mr. Wright was elected secretary of the Empire State Society of the Sons of the American Revolution in 1896, re-elected in 1897, and was one of its most enthusiastic and energetic members. He became a member of the Order of the Founders and Patriots of America in the very early days of its existence, was a member of the Council of the New York State Society; also of the Patria Club, the Patriotic League and of the American Flag Association, as well as a member of the New England Society in the city of New York.

On his maternal side Mr. Wright, as his name indicates, came of a line of Long Island Quaker ancestry—the Mott's—from whom he inherited the liberal, strong sense of justice and sterling integrity, which were marked traits in his character, as well as that love of peaceful and quiet home life, which he so much enjoyed when not engaged in some labor for the benefit of his fellow men.

The funeral services were held Monday, September 24, at his late residence, the Rev. Watson of the Protestant Episcopal church at Glen Cove officiating. The Masonic ritual was performed by Worshipful Brother Noles, a Presbyterian minister who is Grand Chaplain of the Masonic fraternity of the State of New York. The interment was at Greenwood Cemetery, Brooklyn.

◆

Convention of Makers of Sand-Lime Products.

According to advices sent out by H. O. Duerr, secretary of the National Association of Manufacturers of Sand-Lime Products, the next convention of that organization will be held in Chicago on December 5, 6 and 7 of the current year.

◆

THE new 16-story store and office building which is in process of erection on the site of the old Broadway Tabernacle has a frontage of 99 ft. on Broadway, 150 ft. on Thirty-fourth street, with an extension fronting 53 ft. on Thirty-fifth street. It will be of steel skeleton frame, and, according to the architects, Townsend, Steinel & Haskell, 29 to 33 East Nineteenth street, will require about 4500 tons of metal. The contract for the structural steel work is in the hands of Post & McCord, 44 West Twenty-third street, but the general contractor is Charles T. Wills, 156 Fifth avenue, New York City.

WHAT will probably be the largest paper mill in the United States is about to be erected on the Great Miami River in Hamilton, Ohio, it being over ¼ mile in length. It is to be occupied by the Champion Coated Paper Company, and the contract has just been awarded to Frank B. Gilbreth, 34 West Twenty-sixth street, New York City. The mill will be of brick and reinforced concrete. The same contractor also has in process of construction the largest pulp and fiber mill in the world at Canton, N. C., the plant covering when completed 12 acres of ground. This mill will furnish the pulp required for the Hamilton mill.

CORRESPONDENCE.

Rules for Finding Various Hopper Bevels.

From R. W. McD., *Uniontown, Pa.*—In the October issue of the paper I notice the letter of a correspondent who asks for rules for finding the various bevels of hoppers. In reply I enclose three diagrams showing my rule. I expect this rule is old, but I have never seen it so it is new as far as I am concerned, and what is of more importance, it is accurate. In Fig. 1 is represented the method of finding the cuts for an ordinary square hopper all sides of which have an equal flare. In doing the work I joint the edge of a board and erect the perpendicular G C. Take the run E G of the required slant and the rise G F and draw E F, which will give the required slant. Take G C equal to E F and draw E C, when the bevel at E will give the side cut.

In order to obtain the cut for the butt joint draw K G square with E C; make G H equal to E K; connect H with F and the resulting angle F H G will be the cut for the butt joint. In nine out of every ten rules I have ever seen given for finding this cut they appear to get the same angle as would be obtained by taking the perpendicular from the line E F instead of E C, which would be too acute.

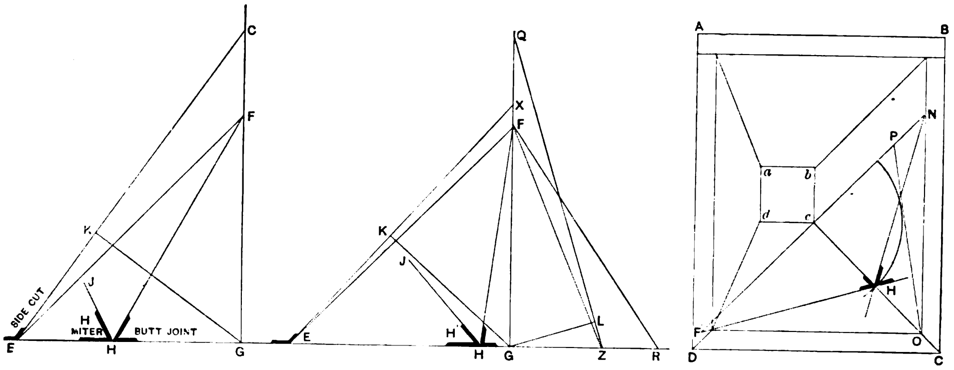
The miter cut is obtained by either bisecting the angle E H F or by taking the length of the side cut E C on the blade of a square and the rise on the tongue—the tongue gives the cut.

The proof of this rule will be found by comparison with Fig. 3. Here is shown an old and tried rule for determining the cuts of hip rafters applied to a hopper. A hopper is simply an inverted hip roof and the rules governing the cuts of the hip rafters with their backing will apply to hoppers. It will be noted that the angle at H in Fig. 3, in which the larger bevel appears corresponds to the miter joint in Fig. 1. I have a geometrical demonstration of the correctness of this, but as it is so easily seen I do not consider it necessary to take up space with it. As for the correctness of the side cut in Fig. 1 it is evident that the line E F represents the width of the side and that if the side is raised to a perpendicular position the upper corner will fall upon the point C, as C G equals E F, and that it will be necessary to take off as much from the lower edge as is shown by the run of the hopper E G.

This rule also applies to hoppers in which the sides do not all have the same flare. The operation is shown in Fig. 2, where E F and F Z are the given flares. The line E X corresponding to E C in Fig. 1 is obtained by making G X equal to F Z. In like manner the butt joint H of Fig. 2 is obtained by making H G equal to L Z. The cut for the butt joint on the side having the lesser flare is obtained by making G R equal to E K.

These rules will be found to be entirely accurate in hoppers of all flares and can be proven either by geometrical demonstration, or what is more to the point, a practical test. The advantage claimed for them is the fact that they require but few lines, can be laid out with the steel square alone, and that all the required angles come at the jointed edge of the board, thus making it easy to set the bevel.

As above stated I do not claim that this rule has never been used before, although I have never seen it, and in fact all rules for finding the cuts for hoppers are practically the same, the same principles underlying all of them. I have seen rules in what are supposed to be standard works in which the angle from the butt joint is taken from the wrong line—the given slant of the hopper instead of the side cut—which is bound to be too acute, thus throwing everything wrong. I once followed one of the rules mentioned on a hopper shaped box of extreme flare, being exceptionally careful as to my measurements and when I came to put it together I found that the butt joint would not fit at all. This set me thinking and I went over the rule carefully and found where it was wrong. This led to my figuring out the above rule for myself, and trust that it will be of assistance to the correspondent in question. I could furnish the geometrical proof of the correctness of this rule if required, but as it would occupy considerable space and be of no practical value I thought best to omit it.



Figs. 1, 2 and 3.—Diagrams Showing Rule Suggested by "R. W. McD."

Rules for Finding Various Hopper Bevels.

Septic Tank for Private Residence.

From S. B., *Flagstaff, Ariz.*—It is possible some of the readers may be interested in the subject of the septic tank for the disposal of sewage for private residences and I will therefore relate my experience of the past two or three years with this system as the results have been generally very satisfactory. We were driven to use something of the kind in the first place owing to the almost totally impervious nature of the soil in this vicinity and to the lack of sewerage facilities in many cases where modern plumbing was desired by customers.

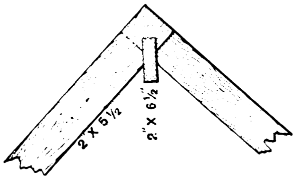
We have one septic tank in operation to-day which has been in constant use for nearly four years and which has never during that time given any trouble whatever. This particular tank was devised chiefly as an experiment and was merely excavated in a tough and impervious clay without walling or cementing of any kind. The effluent liquid is allowed to percolate through a trench filled with roughly broken stone, and the tank and trench are covered with heavy plank and about 18 in. of earth. When this tank was first put into operation a small section of the cover was made removable so that results might be observed from time to time, and observations were made for about two years. Latterly, however, it has been left to itself.

Our winter weather here is quite severe and the diurnal range of temperature is very great, and so we utilized the warm water from bathtub and kitchen sink to keep up the temperature in the tank. This particular tank was merely an experiment and in a very crude form, and we mention it particularly merely because it has been longer in operation than any others with which we have

had experience. We have now, however, several in successful operation and have one in contemplation at present to dispose of the sewage for a building containing about 20 lavatories, seven closets and four bathtubs.

Calculating Board Measure Mentally.

From T. T., *Philadelphia, Pa.*—I find in the October issue of the paper that the first problem under "Calculating Board Measure Mentally" which appears on page 322 is incorrect.



Construction of Roof at the Ridge.

According to the rule therein presented I find the answer of the problem to be 9 1-3 ft. The operation is as follows:

2 x 4 = 8 in. in one lineal ft.
8 x 14 = 112
112 ÷ 12 = 9 1-3 ft., or
8 in. = 2-3 ft., and in 14 ft. we have $\frac{28}{3}$ not $\frac{20}{3}$

as printed in the article in question, the result being 9 1-3 ft.

I appreciate very much the value of your magazine because of its interesting and instructive matter, but mistakes like this are sometimes discouraging.

Note.—We are very glad to have the letter of our correspondent as it clearly demonstrates the fact that the columns are closely scanned by the practical readers who are quick to note any discrepancies which occur. Our correspondent, however, will note that the article in question was a reprint from an exchange and the error was not apparent at first glance.

Construction of Roof at the Ridge.

From OBSERVER.—In roaming about the country places in New England recently my attention was drawn to a form of roof construction at the ridge, which, while not in any sense new, yet is sufficiently rare at the present time to justify a few words of comment regarding details. Instead of the rafters being beveled at the ridge as we so commonly see them, they were notched and hung on to the ridge after the manner indicated in the sketch. The rafters were placed the customary distance on centers, but the dimensions were 2 x 5½ in., while the ridge piece was 2 x 6½. The roof, it might be stated, covered a carriage house and workshop on a farm and was of recent construction, and the object of this communication is to inquire of the readers of the paper to what extent the practice illustrated in the sketch obtains at the present day in other sections of the country.

A Wrinkle in Shingling or Clapboarding Walls.

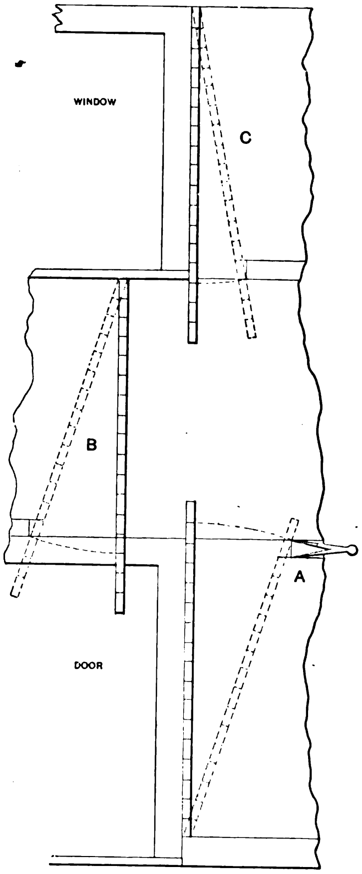
From C. J. M., *St. Johns, N. F.*—I enclose herewith sketch illustrating a "wrinkle" which I find very handy in shingling or clapboarding walls where there are a great many windows and spaces of different hights, for it saves a good deal of time in dividing for the different courses. Before starting the work dress up a rod about an inch square and a foot or so longer than the hight of the highest space or window and upon this rod mark off the maximum width of course—that is, the widest course that you intend to run. Now the first space you want to divide up may be from the water table to the top of a door. If so, proceed as follows: The first course over the base being on, place the rod by the side of the door casing, keeping the lower end of it even with the bottom of the course as indicated in the sketch inclosed. If a mark on the rod comes even with the top of the door it is all right and you can run the course that is on the rod, but if the marks on the rod do not work out even draw a level line on the wall from the head of the door, then swing the rod off until the next mark on it above the door coincides with the line as indicated by the dotted rod. With the compasses take the plumb distance between the line and the next lower mark on the rod as shown at A in the sketch, and it will divide the hight of the door equally. All this is clearly indicated in the lower part of the drawing.

At B is shown the manner of using the rod in the space between the head of a door and the sill of a window, while at C is shown the manner of dividing up a space equal to the hight of window casing. This is all very simple and is one of the first problems in practical geometry, yet I find that not 1 carpenter in 10 uses it.

Here is another point that may interest some of the readers of the paper. In dividing for brackets under a cornice I have seen a man spend an hour on one side of a house and did not get the work right after all. My method is to put two end brackets in place, these being generally set over the center of the quoin; then I take the thickness of my brackets collectively off one end and divide the remaining space into one more part than I have brackets. Suppose for example I have 20 brackets 3 in. thick to place in a space of 47 ft., the solution of the problem is as follows:

3 x 20 = 60 in. = 5 ft. 47 — 5 = 42 ÷ 21 = 2 ft.

which is the space between the brackets.



A "Wrinkle" in Shingling or Clapboarding Walls.

If any of the readers have wrinkles or methods of

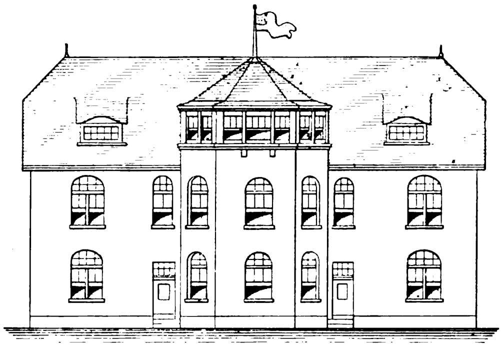
doing this or other kinds of work I trust they will let us hear from them through the Correspondence Department, as it all tends to make the paper more and more interesting, as well as furnishing valuable hints to many who have not been long in the trade and even to some of the older members of the craft who are not averse to picking up an idea now and then.

Roof Plan for Orphanage.

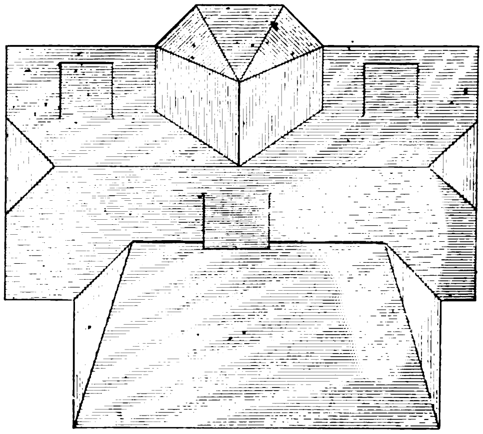
From C. S., *New York City.*—In reply to the inquiry of "W. H. G.," Crescent, N. C., which appeared in a recent issue, I inclose elevations, plan and a detail of a roof for an orphanage which I trust will interest him.

Elements of the Segments of a Circle.

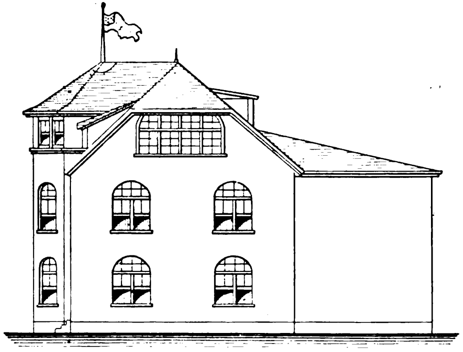
From H. N. S., *Shelby, Ohio.*— I would like some information regarding the elements of a circle. Within the last six years I have originated practical methods for finding the hight or spring of a segment of a circle, knowing the chord of the segment and the radius of the corresponding circle. Having the hight and chord of the segment I find the radius of the circle. Having the hight of the segment and radius I find the chord of the segment. I would like to know the best methods for the three preceding operations.



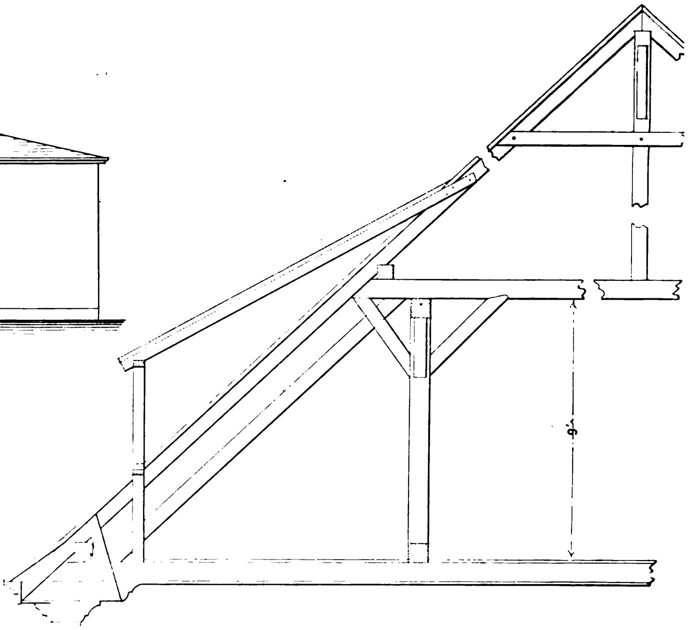
Front Elevation.



Roor Plan.



Side Elevation.



Detail Showing Construction of Roof.—Scale, 3-16 In. to the Foot.
Roof Plan for Orphanage.

Answer.—To obtain the hight, or, as it is sometimes called, the rise or middle ordinate, half of the chord should be squared and this then subtracted from the square of the radius. Find the square root of the remainder and subtract it from the radius and the result will be the length of the required rise. This is an exact rule, but sometimes an approximate one is used which is as follows: The square of one-half of the chord is divided by twice the radius and the quotient is the result approximately.

To obtain the length of the radius when the rise and chord are known, to the square of one-half of the chord add the square of the rise and divide the sum by twice the rise. This quotient is then the length of the radius.

To find the length of the chord, either one of two methods are ordinarily used. The rise is subtracted from twice the radius and this remainder multiplied by the rise; the square root is then taken of this product and the root multiplied by 2; the result is the length of the required chord. The other method is to subtract from the square of the radius the square of the difference between the radius and the rise and then to take the square root of this difference, which multiplied by 2 gives the length of the chord.

An Excellent Suggestion for Making Better Workmen.

From P. C. D., *Fryeburg, Maine.*—As the Sage of Highland Falls has seen fit to offer me a little friendly advice he ought not to object to receiving a little in return. His letter in the October issue of the paper puts me in mind of a story about a certain Justice of the Peace who occasionally held court for the trial of petty offences. As soon as he had issued a warrant he would go around before hearing the evidence and tell every one he met how he was going to decide the case. He jumped at conclusions and that is what "Old Chip" has done. The fact that I am at present living in a small town for reasons which seem sufficient to me, is no evidence that I have always lived here, and it is just possible that I may have trav[illegible]untry some before I settled down in this

place. I have no objection to any man disagreeing with me on any subject, but if he wants to criticise my methods of doing work let him point out the bad features and then tell how to better it. In this way we can make real progress. In the only criticism I have made since being a subscriber to *Carpentry and Building* I stated what my objections were.

I plead guilty to the charge of not being quite as old as "Old Chip." I do not think, however, that years alone are a sure guarantee of skilful workmanship, as I have known men with 50 years' experience who could not bore a straight hole with a bit.

Now boys let us drop all personalities and confine ourselves to the questions at issue and see if we cannot make better workmen of us all.

Condensation on Under Side of Roof.

From EXPERIENCE, *New York.*—Referring to the question of "C. F. S.," Trenton, Tenn., on page 336 of the October issue, I would say that I know of a building in connection with which there was the same trouble as he mentions and a great deal of it. The structure is roofed with galvanized iron. In remedying the trouble waterproof paper wide enough to cover two or more joists was run along the joists, lapping the edge of the second course of paper over the edge of the first course and then nailing lath along the joists on which the edges of the paper lapped. This made an air tight chamber between the joists which ended the condensation business. This work was done over 10 years ago and since that time there has been no trouble.

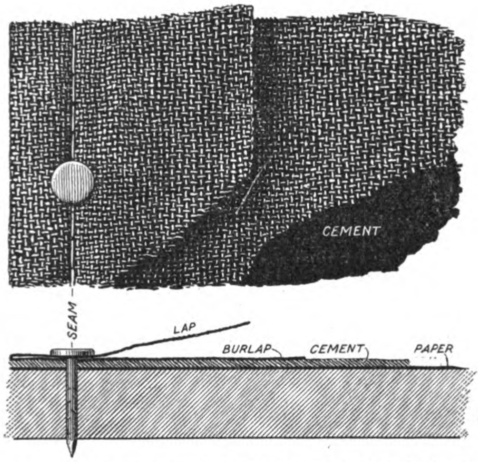


Fig. 1.—Plan and Section Indicating Method of Laying Composition Roofing.

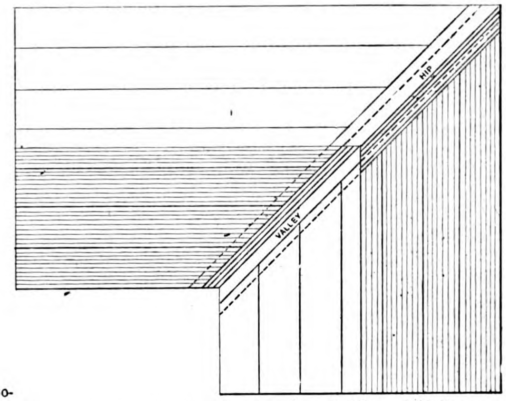


Fig. 2.—Showing Construction of Hip and Valley.

What Is the Best Roof Covering?—Material Suggested by "D. J. H.," Troy, N. Y.

What Is the Best Roof Covering?

From D. J. H., *Troy, N. Y.*—I read with considerable interest the inquiry of "W. T." in the August issue of the paper, and as I have had considerable experience in laying roofs I will describe a form of covering which has given satisfaction, at least in this section of the country. It is a composition covering (Fig. 1), but it is laid very much as a flat tin roof, starting at the lower end of the roof and working upwards. The material is given about 2 or 3 in. lap and the flashing of the walls is done in practically the same manner as would be the case with tin. As a general rule this form of roofing is put on at right angles to the way the boards are laid. For a gable roof it is laid from the bottom to the top, but it can be laid up and down, as it makes a good job either way. For a valley roof first lay one sheet directly in the valley, starting from the lower end, and then lay each side of it. For a hip roof it is laid the same as a gable roof to the hip and then a saddle or ridge is placed on the hip made out of the same stuff. The only difference between a hip and a valley roof is that in the one case the sheet is laid under the paper and a hip is laid over the paper to keep the water from it the same as tin is put in a valley under the shingles. The idea is illustrated in Fig. 2.

It may be stated that the lap is arranged by extending the burlap about 2 in. to the outer edge of the sheet, so as to form a double thickness along the edge where the nails are driven. The nails are about 1¼ in. long and have a head about ½ in. in diameter, so as to securely hold the material in place.

The heads and seam are covered by the lap, which is cemented down over them, thus making a waterproof joint and at the same time protecting the nails from rust. I think the correspondent will be able to understand the construction from the sketches which I send.

Finding Capacity of Tapering Tanks.

From H. N. S., *Shelby, Ohio.*—I see in the Correspondence Department of the paper, August issue, a communication regarding capacities of tapering tanks from "R. T. V.," Terre Haute, Ind. In the last paragraph he gives as the result of his work 1247.5008 gallons, which is equivalent to 212.34+ cubic ft. This multiplied by 5.875 gives the number of gallons as 1247.5008. The constant 5.875 I derive from the old arithmetical method of calculations, wherein the dimensions were all in inches, the diameter squared and multiplied by the hight, then by .0034, resulted in gallons. If it is desired to find the number of barrels for a tank of the dimensions in feet, the number of cubic ft., 212.34, multiplied by .187 will give the required result.

From W. B. G., *Louisville, Ky.*—With regard to recent discussions on calculating the capacity of tanks there is one short rule not generally used that requires no lengthy explanation: As 295 cylindrical inches are about equal to 231 cubic inches the multiplication of 0.7854 may be omitted. Dividing by 295 instead of 231 will give the same result with much less labor.

How Shall a Church Be Ventilated?

From W. C., *Hamiota, Manitoba.*—I wish you would ask the readers of your good paper for the best way to ventilate a small church building. At present there is an opening through the ceiling into the attic, but the only outlet from the attic to the outside of the building is through the small opening into the tower. This opening, however, is about 3 ft. below the opening through the ceiling. Owing to the formation of the building no other opening can be made except through the roof. I have recommended a ventilating pipe from the ceiling up through the roof, but my people are a little afraid of its appearance if projecting much through the roof. I hope some of the readers who have had experience with similar problems will give me a practical solution for ventilating this small church.

is just as pretty in natural finish, and nearly as hard, just as durable, and besides, it is a most beautifully variegated grain, susceptible to nearly any imaginable stain or coloring, and it seems with stains of most any kind it only has a tendency to bring out the grain more beautifully than ever, and this cannot be said of oak, for it is susceptible to very few colors. I have studied the question of fir doors, have made and used some of them for over 20 years past and wish to say that I consider the ordinary fir door the very best common door that was ever made. Who could wish for anything more beautiful in a common door than one made of fir stiles and rails, edge grained, with five cross panels bastard grain, as hard and durable as any oak door, and yet get it for the price of an ordinary common door? And the same thing is true of all kinds of interior finsh. To any one wishing a first-class job in a fir door and wishing to pay additional price, I would advise a door made up of a cedar or spruce core and veneered with bastard fir. In this way the flat grained effect can be had throughout the entire door; the interior finish can all be had in bastard fir. The reason for not using a flat grain in the stiles of a solid floor is that it is a little harder to work and will warp a little, whereas the edge grain will not.

The Shrinking of Fir.

I desire to say that fir lumber when once thoroughly kiln dried will not shrink, but unless it is it is sure to shrink more or less and in this way will give considerable trouble. In speaking of air dried lumber don't understand that I condemn it altogether, for it will do very well for ordinary finish where there is no objection to a little pitch coming out from time to time. It does not come out in sufficient quantities to run but only comes out in small specks leaving the wood spotted, and consequently would be objectionable for a first-class finish. Some of this finish may be seen in the Hotel Portland, Portland, Ore., as well as the Tacoma Hotel, Tacoma, Wash. Fir lumber when finished in the natural color will darken several shades within a few years, but this does not detract from its beauty; in fact a great many prefer it and say that it is a little too bright when first finished.

The Merits of Spruce.

In further discussing our wood for interior finish I wish to call your attention to our beautiful soft grained spruce. This comes nearer to Eastern white pine than any lumber we have on this coast. There is no defect to be guarded against for interior finish; all that is necessary is to thoroughly dry it outside or in a dry kiln, either of which will make it suitable for first-class finish. It is especially well fitted for sash and doors. It makes an excellent door, stands well, does not warp as much as white pine, but is a little harder to work. When finished, however, it is uniformly white and looks almost like an Eastern white pine door. It is soft and light and is therefore very acceptable to the Eastern mechanic. It is one of the best known substitutes for the Eastern white pine regular stock door. It also makes very fine finish, and as it is easy to get in any ordinary dimensions, both wide and thick, perfectly clear if so desired, it makes an excellent substitute for white pine finish. Personally I have made spruce doors, put in various kinds of spruce finish in a number of different places for over 20 years, and I wish to say that in my judgment as far as durability is concerned it is fully equal to any white pine I ever saw.

Hemlock Advantages.

Lastly I want to call your attention to one of the finest woods for interior finish that ever grew, and that is our hemlock. If it were not for the name "hemlock" I believe it would have been in general use for interior finish, for I have yet the first person to meet who has not praised it most highly after seeing it finished. It is considerabdy harder than our spruce, yet not quite so hard as the fir. It takes a fine natural finish and will stain most beautifully. This may be seen in what is known as the "lumbermen's room" in the Tacoma Hotel; the natural finish can be seen in a number of places. It has somewhat the appearance of Eastern maple and runs a little to the effect of bird's-eye maple.

After nearly 30 years of experience with the lumber of this coast I am fully convinced that it is not far hence when our lumber will be used very extensively for interior finish not only in the West but throughout the entire East. We can, however, do a great deal to retard its progress by sending lumber East that has not been properly treated and machined. If we do our best, however, I predict that it will not be many years before our lumber will be in such a demand for interior finish that we shall not be able to supply the demand, and lumber that we are now selling for $20 to $25 will bring $40 or $50 per 1000 ft.

◆

A Co-operative Apartment Plan.

Attention has from time to time been given to co-operative schemes of housekeeping, the idea being to obtain maximum comforts with a minimum of cost and trouble, and now the high rents of apartments in New York City have resulted in the development of a scheme to cheapen them and at the same time meet the conditions surrounding flat dwelling. One scheme in particular promises beneficial results provided the ideas of its promoters can be carried out. The plan is the natural outgrowth of disgust with increased rentals and living expenses on the Island of Manhattan and elsewhere, and according to the *Post* the plan proposed is for a number of tenants to band together, form a co-operative society, and purchase an apartment house of 14 to 20 apartments, each stockholder to occupy a flat and pay his share toward the first payment on the property, which varies according to the location, desirability and cost of the apartment chosen, from $350 to $600. After this is done the house is to be operated on a co-operative basis, each tenant to pay a rental sufficient to meet the interest and expenses, a certain sum toward paying off the second mortgage on the property. The promoters of the idea figure that within five or six years the second mortgage will be liquidated, after which it will be optional with the landlord-tenants whether they continue to pay interest on the first mortgage or proceed to liquidate it also.

Even if the scheme is successful until the payment of the second mortgage, it can easily be seen that the participants will be in a position to enjoy greatly reduced rents, and in a short time the amount of their first payment will be saved.

Seemingly the one great argument against the proposition would be that, with so many people gathered at random and living in close proximity to each other, friction and confusion would undoubtedly result. Human nature being what it is, and the vicissitudes of flat dwelling being what they are, the argument appears overwhelming. But the promoters of the scheme have apparently foreseen this, for they propose that all differences and dissensions be submitted to a Board of Governors, chosen from among the members of the colony. There is also to be an overseer, whose duty it will be to buy supplies and attend to all general repairs. The cost of repairs to individual apartments is to be borne by the occupant thereof. In other words, the tenant is to own his own particular apartment, just as he would own a house in the suburbs. The scheme may appeal very strongly to those who wish to own their own home, but who do not wish to leave Manhattan Island.

The idea is not an entirely new one, although, so far as known, it has not been applied to smaller apartment houses. There are several studios and larger houses in New York City which have been sub-divided in practically the same manner. Although the proposition has many weak points and may not be considered entirely practicable, it plainly shows that tenants are not viewing complacently the increased cost of living and are looking about to better themselves.

◆

VERY nearly a million dollars is to be expended in the construction of the new 12-story apartment house at the corner of Eighty-fifth street and Central Park West, New York City, the architects being Milliken & Moeller. The building will have a frontage of 102 1-5 ft. on the avenue and 140 ft. on the street, with façades of brick trimmed with limestone and terra cotta.

CENTERS FOR ARCHES OF DOUBLE CURVATURE.*—X.

By Charles H. Fox.

WE will now form the rail by the second method referred to—that is, by forming firstly the cylindrical surfaces of the face. The face mold as required to give the direction for forming this surface is shown in Fig. 29. The principle contained in this construction is that explained in the ordinate method of projecting the elliptical curves, as shown at the diagrams of Figs. O, R. First at the plan, square with A E,, produce lines as shown in I T T'', *u* U U', &c., meeting the line A'' E' of Fig. 29, in the points A'' T'' U', &c. Now square over the ordinates T'' I, U' *u'*, B' *b*, &c., then set off S' I, T'' *t* I, U' *u u'*, &c., equal to the length as given at the corresponding ordinates of the plan through the points given in J *t u*, &c., trace curves which will give the development of the face mold required. Now in the manner explained for the similar operation above select a plank of sufficient size, dress the face and square and straighten up the top and under surfaces of the plank. Then apply the side and plumb bevels, draw the plumb lines and in G *m* of Fig. 24, when measured at the line or arris in which the two surfaces meet. This point is shown also in Fig. 38. Now to the direction given by the patterns work the cylindrical surfaces which form the face surfaces of the rail. Again take note that the surfaces are straight on the vertical lines. These lines are of course in a direction parallel to the edges, as J' J, I Y, of Fig. 38, of the center joint surface. The resulting solid by this operation is shown in the diagram, Fig. 39. Now take the falling mold of Fig. 26 and apply it to the convex surface of the outer face. We may remark that the point as that of 6 of the falling mold must be at a hight above the lower surface of the plank equal to that shown in X 6'' of Fig. 31.

A construction similar to that shown in the diagram, giving the center joint surface of Fig. 31, may be made by the student and from it he can determine the point 6', but the quicker method is to set off Y 6 of Fig. 39 equal to Y 6 of Fig. 25 and square with the surface of the plank draw 6 6'; by this operation the location of the point, both at the inside and outside face, may be determined at which to apply the falling molds. The points as given in R E have already been determined at the lower joint surface at which to apply the patterns. Now take the face mold of Fig. 27 and apply it in the manner shown in the diagram, Fig. 39. This pattern may be developed in the manner explained in connection with a similar operation in the diagram, Fig. 26. Only here we have to set off the lengths as given at the concave plan curve instead of those given at the convex face.

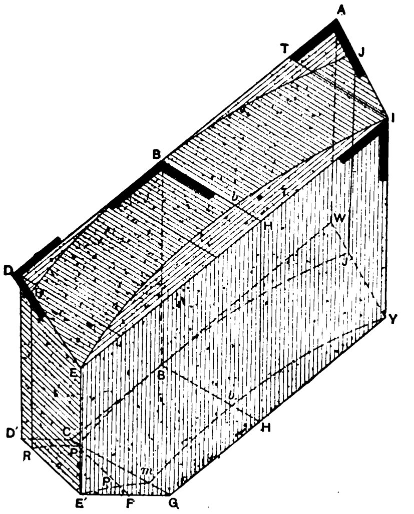


Fig. 38.—Application of Bevels and Face Mold, Second Method of Squaring Up the Plank; Also Oblique Projection of Mold Shown in Fig. 41.

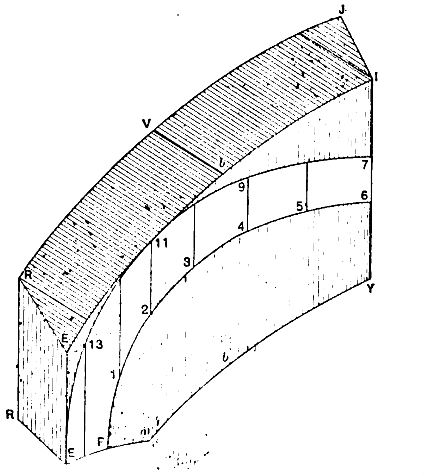


Fig. 39.—Diagram Showing the Operation of Squaring Up the Plank by the Second Method, Also Application of Falling Mold.

Centers for Arches of Double Curvature.—X.

work the surfaces of the joints in the manner before described for similar operations by the first method. Now gauge the plank to its thickness, as that given in B H of the plan. This gives in the points E I, as shown in Fig. 38, the direction in which to apply the face mold. If the work has been correctly done the face mold will, when applied to the points I E. also touch the point as at B of the outside face surface and at the same time coincide with the joint surface of the center joint, and also with the line as D E. as given by the side bevel for that purpose. If these points do not obtain, examine and try up the work and so find out the reason that the mold does not fit. Now cut a copy of the plan as given in *c* R E *m* of Fig. 24. Take the pattern and apply it to the lower joint surface of the plank in such a manner that the point E of the pattern meets the point E' of the plank, when the line R E of the mold coincides with the line D' E', as given by the bevel E Y W. A point is now given in *m*, which, together with that of a point as shown in Y of Fig. 38 of the inside face surface, determines the points at which to apply the face mold of Fig. 29. A study of the diagram, Fig. 38, will clearly show the proper manner of applying the face molds to the two surfaces.

As a test to the correctness of the point *m* at the plank it should be found on trial equal to the length as given

To the beginner it may appear that the length as given at one curve would be equal to that given at the other curve of the plan, but on trial it will be found that a great difference exists between their length, the length as given at the concave being greater than that obtained at the development of the convex. Understanding this, the lengths, &c., as given in N 1, &c., of Fig. 25, are transferred to the corresponding points, as shown in *k* 1, &c., of Fig. 27, and the developed curves traced as before. Having applied the molds, form the surfaces of the soffit and exterior bounding element to their direction, and finish the solid of the rail in the manner before explained for similar operation in the first method. In Fig. 40 is shown an orthographical projection of the finished solid of the sash head as now formed. To the directions already given above for the similar operation finish the molding and contour of sash.

With the development of the diagrams shown in Fig.

---

* Copyright, 1906, by Charles H. Fox.

41 we shall explain the construction of a cardboard representation of a solid, showing the actual inclination and position, together with the development of the section planes, sections and bevels, each section respectively being developed and applied in its own plane, which belong to the upper and lower inclined surfaces and that of the joint surfaces of a plank, out of which a rib piece forming one-half of a cylindro-cylindric sash may be constructed, a full description, &c., of which was given in the diagrams, Figs. 24 to 31.

In our opinion this problem and those to be considered of similar construction are the most interesting ones connected with this series. Consider for a moment the particular developments that are to be worked out. We have not only to develop the several sections and ascertain the exact shape and size of the intersecting planes and surfaces, but to do all this upon the one plane—that is, the plane of the paper, and in such a manner that when the drawing is cut out and folded together it will form a determinate whole—that of a representation of the plank, with the sections applied to its several surfaces. As a practical lesson it cannot be beaten.

To construct the model we proceed in the same manner as in connection with similar constructions shown in Figs. 24, 28, 29, 30 and 31.

To develop the end over D E we proceed as follows: Square with E D draw D D″ and E,, E, making the length of these equal respectively that of the corresponding lines of Fig. 28. Join D″ E,, and the size and shape of the side required may be developed. Now comes the more intricate problem of the model—that of finding the shape and size of the section plane of the center joint, together with that of the section of the lower inclined surface of the plank, attached to it in the manner shown in the drawing. The student will find the solution of this problem a very instructive and practical lesson in solid geometry. The finding of the section in its own plane, or in that of a plane parallel with it, is a very simple problem, when compared with that of finding the section as given in an auxiliary plane in the manner required to comply with the conditions of the problem of the model. However, by following geometrical rules and principles the constructions are readily made.

First we will find the angle which the edge, as that of W 5 of the lower inclined surface, may make with that of W T, of the arris or edge of the center joint surface. At any point, as 6, square with the ground line A 16, draw 6, 12 8. This meets the horizontal trace of center joint plane in the point 8. Now parallel with A 16 draw 6, 9 10 indefinitely. This is the vertical projection of a level line in space, of which we may assume the line A 8 to be the horizontal trace. Or to make the construction clearer, we may take the figures given in 9 6, W as the elevation and the line A 8 as the plan of a right angled triangle, the triangle being perpendicular with the horizontal and oblique with the vertical planes of projection. If we revolve this triangle around the edge W 9 the point 6, will fall in 10.

The graphical construction of the figure is made by setting off 9 10 equal with the length given in A 8 below. Then, joining W 10, the true section of the triangle may be developed.

We may now assume the point given in 10 to be that of one fixed in space, and of which 6, and 8 are taken respectively as the projections of the same. This un-

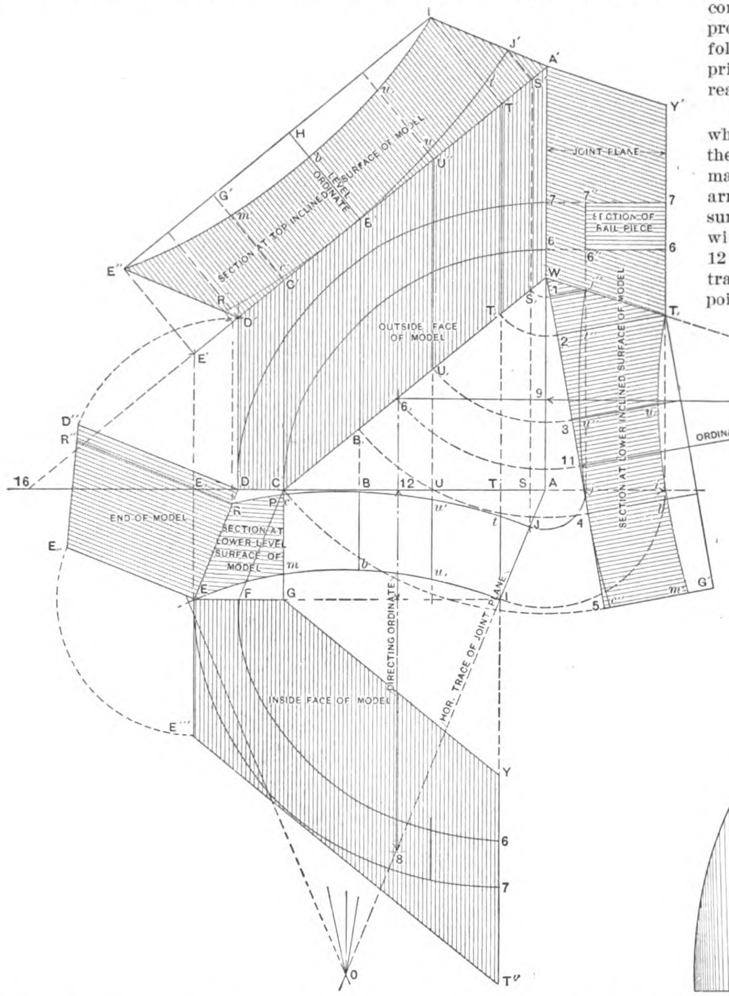


Fig. 41.—Diagram Showing Construction of Cardboard Representation of the Problem Illustrated in Figs. 24 to 31.

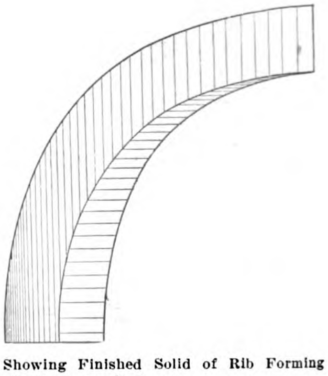


Fig. 40.—Projection Showing Finished Solid of Rib Forming Half of the Sash.

Centers for Arches of Double Curvature.—X.

derstood, with W as center and W 6, as radius, describe an arc in 11; then with point 10 as center and 8 12 as radius draw an arc in 11. A line as that given in W 5 drawn from W through the intersection given in 11 gives in 5 W T, 10, the angle which the edge of the section plane of the lower inclined surface may make with that of the line W T, of the lower arris of the center joint surface. Now drawing a line as that shown in 11 10 through the intersection given in 11, the position of a level line lying at the surface of the section plane may be obtained. Now with W again as center rotate the points given in S, T, U,, &c., into the corresponding points given in 1 2 3, &c., then parallel with 11 10 draw 1 *j*″, 2 *t*″ T,, 3 *u*″ *u*,, &c. Now set off 1 *j*″, 2 *t*″ T,, &c., respectively equal to the lengths as given in the corresponding ordinates of the plan, and trace curves through the points given in *j*″ *t*″ *u*″, &c. Draw the line T, G parallel with W 5 and the section plane, together with the section as required thereon, may be developed. Now parallel with W T, draw A Y″ and parallel with W A draw T, Y″, and the section plane of the center joint surface may be developed. The construction of the section of the rail piece is so simple that it needs no further explanation. As a test of the correctness of the drawing the student may produce the line A 16. Then with A as center rotate the points given in J I into points as shown in *j i*. Now parallel with A A′ draw *j j*″ and *i* T,, and if the drawing is correct the lines just drawn will coincide with the points already obtained in *j*″ T,.

Take a sharp knife and cut through the board at the outline of the drawing, noting that the plan be left intact; then at the lines G E, E D, D C, D′ A′, A′ W, W T cut about half through the board. Now with the lines at the exterior fold over the three vertical sides—namely, the outer and inside faces and the end over E D. Touch the edges with glue and bring them together, and fold over the section plane of the top inclined surface. This done fold around the surface of the center joint, the edges of which if drawing is correct will coincide with the edge A I of the upper plane and with T″ Y of the inside face. Now fold under the plane of the lower section, the edges of which if the drawing has been developed correctly will meet those of the outer and inside faces of the model and the line 5 G′ will fall over that given in C G of the plan.

In this simple and expeditious manner may be obtained a representation of the "squared up plank," with the sections and bevels applied in the manner similar to that which obtains in the practical construction of the rail piece. On an examination of the model the ordinates of the two inclined surfaces will be found parallel with the horizontal plane containing the plan. The corresponding ordinates of these surfaces will also be found to be the intersections of the vertical plane which may contain the elements—that is, the ordinate as that shown in B′ H of the upper surface is the projection of the intersection of the vertical plane, which also intersects the lower surface in the projection 4 *b*. These and other simple points may be very clearly followed by an examination of the model.

The constructing lines of the surfaces being at the exterior their connection one with the other may be thus fully understood, and by means of the representation of the plank "squared" up as in practice the young student may be enabled to get a clearer insight into the geometrical principles employed in the development of the several sections and bevels than he would by any other method. Not only this, but it gives him a knowledge as to the shape the plank should take on before the molds are applied. For it is a very necessary preliminary in this kind of work that the workman should have a correct knowledge as to the appearance it should have when finished, and also what is to be done to give it such an appearance. Some knowledge of geometry is, too, of the first importance in work of double curvature; indeed without such knowledge it is not possible for any one, no matter how good a mechanic he may be in other respects, to execute with anything like accuracy a piece of work of this description. This accounts in a great measure for the divergence in the amount of work turned out, as those who have the faculty of seeing the work in front of them can provide ahead the means for doing it in an expeditious manner and thereby take advantage of the waste of time that often occurs through being unable to proceed intelligently. An oblique projection of the model is shown in the diagram, Fig. 38.

WHAT BUILDERS ARE DOING.

THE reports which reach us from various sections of the country for the month of September emphasize the check to building operations, which was noted in these columns for the month of August. While the falling off is not so marked in any one locality as in the month last named, the decline is more uniformly distributed over the country, and is not by any means confined to the smaller cities as has often been the case. When, however, the enormous volume of operations last year is considered it is not strange that there should now appear some cessation of work in this line, more particularly as in some cities it has become apparent that building has been more or less overdone. The labor situation is generally satisfactory, and it is only now and then that we hear of anything like a serious interruption to building operations through strikes or lockouts. Taking the country over, the building business appears to be in a most prosperous condition.

Boston, Mass.

According to a careful view of the situation based upon the records of the Building Department unusual activity is expected in the building line for some little time to come. Building Commissioner John A. Rooney states that the records of the city for some time past show an increased amount of building, especially during the past three or four months. The commissioner estimates the value of new buildings and alterations since the first of the year as more than balancing the value of the operations conducted during the whole of the preceding year. Concrete construction has taken a sudden leap into popularity, and several permits have been issued for this kind of work both for dwelling and mercantile purposes.

Commissioner Rooney has made additional provisions to be followed in the use of concrete for building constructions, as follows:

> Concrete mixed on proposed site and deposited in place immediately after must conform strictly to the specifications and be mixed and deposited in the presence and to the satisfaction of an inspector approved by me, and such inspector shall make reports to me as I may from time to time require.
>
> Concrete blocks shall be mixed according to specifications submitted, made in some suitable building, stamped with the maker's name and date of manufacture, shall be kept out of the sun and in a moist atmosphere for four weeks, and shall not be used within five weeks of making.
>
> The manufacturer of any proposed blocks shall, if required by the commissioner, submit his blocks to any desired test, and shall continue to do so at any time during the progress of the work. The blocks so tested to be chosen by an inspector from those on the site of the proposed building and the maker of the block to bear the expense of said test.

The reason for the increase in building operations is credited to the revision of the building laws, which has done away with a number of the prohibitory restrictions in the matter of erecting tenement property as well as converting old property in tenement structures.

Baton Rouge, La.

In connection with a request for an increase in their wages from 50 cents per hour to 55 cents per hour, the members of the Brick Masons' International Union at Baton Rouge, La., presented a tabulated statement of the scale of wages of the brick masons in some of the principal cities and towns in the State where local unions exist:

"Local No. 1, New Orleans, 75 cents per hour, eight hours' working day.

"Local No. 2, Shreveport, 75 cents per hour, eight hours' work a day.

"Local No. 4, Lake Charles, 62½ cents per hour, eight hours' work a day.

"Local No. 6, New Iberia, 60 cents per hour, and eight hours' work a day.

"Local No. 7, Monroe, 62½ cents per hour, eight hours' work a day.

"Local No. 5, Baton Rouge, 55 cents per hour, nine hours' work a day."

Chicago, Ill.

The figures of the Building Department for September show an increase in the number of structures for which permits were issued, but a material falling off in frontage. The reason for this state of affairs is the stimulated construction of dwellings and two-flat buildings by people of small or moderate means. Heretofore the totals have been swelled by large apartment houses put up by speculative builders. This class of construction has always been an important factor in Chicago, and while still very active is to some extent being eclipsed at the present time by the smaller structures. Permits were issued during September for the construction of 1085 buildings, having a frontage of 24,609 ft. and involving an aggregate cost of $4,579,200, against 1003 buildings, with 27,525 ft. frontage and costing $7,349,150, last year, a gain of 82 buildings and a decrease of 2916 ft. of frontage and $2,769,950. The figures for September for several years past are as follows:

	Number buildings.	Feet frontage.	Cost.
September, 1906	1,085	24,609	$4,579,200
September, 1905	1,003	27,525	7,349,150
September, 1904	802	24,327	4,919,950
September, 1903	614	16,299	2,164,300
September, 1902	573	16,817	3,517,450
September, 1901	492	14,024	2,914,160
September, 1900	461	12,734	2,347,200
September, 1899	281	8,205	1,217,950

Building for the nine months of this year establishes a record in point of cost, and is only surpassed in number of buildings and feet of frontage by the year 1892. An increase was made over the three-quarter period of last year of 1939 buildings, 31,795 ft. of frontage and $3,620,365 in cost. Chicago's building figures for the first nine months for several years past follows:

	Number buildings.	Feet frontage	Cost.
1906	8,274	214,887	$51,357,480
1905	6,335	182,082	47,737,115
1904	5,434	159,298	31,082,240
1903	4,658	127,385	24,871,700
1902	4,761	143,771	38,473,535
1901	4,714	132,377	27,073,715
1900	2,465	66,583	10,687,960
1899	3,071	91,301	17,455,270

Some large building propositions have loomed up recently, the most important of which is the proposed construction by the Chicago & Northwestern Railroad of a $7,000,000 passenger station in this city. Thirteen million dollars additional are to be expended in right of way purchases, track elevation and other essentials to improved terminal facilties. Ground for the new station will be broken next spring and its completion is expected in less than two years. All trains will enter on elevated tracks, as in the La Salle street station, and the train sheds extending from Washington to Lake streets will contain 16 tracks, each capable of holding a 15-car train. The station will be erected just north of the present Union station, fronting on Madison avenue.

Cleveland, Ohio.

Building operations in the city of Cleveland are progressing with much vigor during the fall, all classes of workmen being fully engaged. It is anticipated that the fall and early winter will be a very busy one for the architects and contractors, a large amount of work being started with a view to getting it well under way before cold weather arrives.

During September there were 645 permits issued for building improvements valued at $871,426 as against 435 permits for building costing $949,100 in the same month last year.

An attractive programme of social affairs is being arranged for the members of the Builders' Exchange to be held in the Chamber of Commerce auditorium. The first of the series will be held November 17, and others are scheduled for alternate Saturday evenings. The gatherings will be under the auspices of the Exchange Social Club, which had in charge the functions given last winter and which were highly delightful in every way.

A special committee of the Builders' Exchange is investigating the subject of trade school education, and is in hearty sympathy with efforts being made by the Board of Education to extend the manual training departments in the public schools. A class in brick laying was conducted last year by the Mason Contractors' Association, and will probably be resumed in January. A class in plumbing is also being conducted as a private venture, while classes in mechanical drawing, estimating, electrical engineering and one or two other trades are being taught under the auspices of the Y. M. C. A. The chairman of the exchange committee is very much in favor of providing a building to be used by various trades affiliated with the exchange for the accommodation of classes to be instructed in these trades, but a satisfactory scheme has not yet been found for launching into so extensive a project.

An investigation of the new sanitary or plumbing code prepared for adoption by the city has been made by the Exchange Special Code Committee and a report submitted to the City Council on this subject. The code is considered to be one of the best ever formulated for an American city, and already there is talk of having it adopted as a national standard. Building Code Commissioner Eisenmann has been occupied for a year or more on the code, having made a very extensive examination of similar legislation and embodied all the good points in the Cleveland measure.

Bids for the new Cuyahoga County Court House were received by the County Buildings Commission at Cleveland on August 15. This is the largest competition to be conducted for several months in Ohio and has attracted widespread attention. The commissioners after several weeks' investigation decided to award the contract to Andrew Dall & Son of Cleveland on their bid for Milford granite, amounting to $2,988,900. No sooner had the announcement been made than several injunction suits were started, one of these being by John Gill & Son, also Cleveland bidders and builders of the Baltimore Court House. It is claimed that Dall & Son did not comply with all the requirements of the specifications touching samples, bond, &c. It is now probable that the whole matter will be carried through the courts and that the starting of the building will be delayed at least until spring. It had been planned by the successful bidders to start work on the excavation this fall, but legal proceedings will prevent this early commencement of operations.

Los Angeles, Cal.

During September the building activity in Los Angeles was a little less marked than is usual at this season of the year. There are, however, plenty of plans in the hands of the architects, and unless the high cost of materials and labor and the existence of strikes and lockouts prevents there should be an active fall. The strike of the carpenters during a part of September did considerable to delay building, both directly by holding up work already under way and indirectly by making capital a little more timid about investing in building. The trouble with the carpenters was eventually settled, the men going to work at $4 per day and getting a half holiday on Saturday. Before the trouble was settled, however, a large part of the carpenters had left for San Francisco where better wages were to be had. It is claimed that the available supply of carpenters was reduced by from 15 to 20 per cent., but so far the shortage has not made itself felt.

During the month a total of 633 permits were issued, these having a total valuation of $1,020,774. This is, however, a slight falling off from the September record of the previous three years.

At a meeting of a number of the members of the Employing Builders' Association recently held in this city an agreement was signed to stand as a unit in maintaining the open shop. The resolution which was adopted is as follows:

> *Resolved*, That it is the sense of this association that an open shop be maintained throughout this city; that a week's work shall consist of six days of eight hours each, and that the same wages for carpenters be paid as has heretofore been the rule.

Minneapolis, Minn.

Ground will be broken within the next few days for the huge plant which the Armour Packing Company is planning to erect in New Brighton, says our correspondent under date of October 7. The company has purchased a tract of upwards of 500 acres within easy access of four lines of railroad, and the work of erecting buildings to cost between $1,500,000 and $2,000,000 will soon be commenced. The buildings, which include packing houses, freight and storage elevators, slaughter houses, rendering factories, &c., will be largely of brick and steel for the exterior and concrete for the interior construction. It is expected that the work will be far enough advanced to permit of the buildings being occupied by midsummer of next year, but at least two years will be required for the completion of the entire plant.

The building figures for Minneapolis during the current year are likely to break all previous records if the statistics for the first nine months are a criterion. Last year, which was the best in the history of the city, showed a total for the first nine months of 3922 permits issued at a cost of construction of $7,151,515. The corresponding period of the current year shows a total of 3736 permits issued at a cost of $7,513,690. The figures for September of the present year are 387 permits with a total cost of $711,525, as against 395 permits for the same month last year and a building total of $797,225.

The reputation that Minneapolis has heretofore borne as a city of beautiful churches is likely to be materially increased during the next twelvemonth. Plans are now under consideration for 15 new church edifices, all to be erected at a cost of not less than $25,000 each.

The labor famine from which the railways throughout the Northwest have been suffering during the past three months has had the effect of interfering materially with the construction work that the Great Northern, the Wisconsin Central, the "Soo" and several of the other lines have been undertaking in Minneapolis and vicinity. Railroad building labor was never in such demand as at the present time, and the result of the stringency is that most of the roads that are engaged in large undertakings here will make every effort to keep construction crews at work all winter long at the ex-

pense of some of the work that is being carried on outside the city.

New Orleans, La.

The Contractors' and Dealers' Exchange has lately been considering arrangements for new quarters and a short time ago a deal was consummated whereby purchase was made of "Castle Hall," a fine old three-story brick building at Perdido and Carroll streets. The exchange expects to take possession of the new quarters about the first of December, as the present tenants do not vacate until November 1 and about one month will be consumed in making the necessary repairs and alterations to the building in order to fit it for the requirements of the organization.

New York City.

There is very little change to note in the building situation, the volume of operations continuing upon a fairly liberal scale, although hardly up to that of the corresponding period last year. Whether or not this is due entirely to the difficulty in obtaining permanent loans by building operators we do not pretend to say, but the fact remains that the figures for September show an appreciable falling off, more especially in the boroughs of Manhattan and the Bronx. In the Borough of Brooklyn a slight increase for September over a year ago is to be noted. The figures for the quarter ending September 30, which are now available, show more buildings to have been planned in the Borough of Brooklyn than in the other four boroughs of Greater New York combined. In Manhattan permits were issued for 362 buildings, estimated to cost $25,668,810; in the Bronx for 518 buildings, to cost $6,686,250; in Queens for 976 buildings, to cost $4,192,229, and in Richmond Borough for 211 buildings, to cost $1,324,333, making a total of 2067 buildings. In the Borough of Brooklyn the number of buildings projected during the quarter was 2320, involving an estimated outlay of $19,919,666.

As regards the labor situation, the only serious friction appears to exist between the bricklayers' unions and the Mason Builders' Association regarding the employment of other than bricklayers to do concrete construction work in buildings.

Philadelphia, Pa.

Whether or not the building of two-story houses has been carried to the limit in this city is a question of considerable interest to the trade. This class of residences has been built during the past few years in unprecedented numbers in all sections of the city, and from a conservative viewpoint it is considered that operation work in this line has reached the crest of the wave. There is no doubt that large numbers of such residences will be erected in the future in certain sections of the city, but whether the general building of these houses all over the city and particularly in some sections will be continued on as large a scale as heretofore is problematical.

Flathouse construction is no doubt on the increase and is obtaining the favorable consideration of both builders and investors. Those portions of the city in close proximity to the Schuylkill River are considered by some as particularly favorable locations for flathouse construction, and plans for a number of four-story buildings of this type are being prepared by several architects. Philadelphia has on the whole been rather partial to the individual dwelling, but as the distance from the center of the city in which the new houses are built increases the need for desirable homes near the center becomes greater. Whether the flathouse will meet this necessity is a question, but there seems a disposition to give it a trial.

Statistically, building operations showed a decline during September. The records of the Bureau of Building Inspection show that 705 permits for 1155 operations, at a cost of $2,414,350, were issued, which compared with the same period last year shows a decline of $198,905, while the decline in comparison with the month of August this year reaches practically $1,000,000.

The total for nine months of the present year, however, shows a material advance over 1905. During the current year 7001 permits were issued for 14,327 operations, valued at $32,292,250, while last year during the same period 6979 permits were issued for 13,974 operations, costing $29,063,830, this being a gain of over $3,250,000 in this year's favor.

At this season of the year building of two-story dwellings usually falls off, and while the statistics show a decline for the month of over $500,000 in this line alone, it is neither unusual or alarming, and no doubt the falling off, unless there is prospect of an exceedingly open winter, will gradually continue during the remainder of the year.

The erection of buildings for manufacturing purposes, both direct and indirect, shows a marked increase during the month, and were it not for the high cost of building at the time it is scarcely without question that the work in this line would be much greater. Weather conditions on the whole continue to favor building work, and every effort is being made on the part of contractors to push work forward to completion before unfavorable conditions prevail. Every branch of the trade is fully occupied and the volume of business transacted by those engaged in supplying building materials is unprecedented, and in many cases operation work is considerably held up by delayed deliveries. Labor is fully occupied, and in many lines skilled mechanics are hard to obtain.

Plans have been filed with the Bureau of Building Inspection by W. Z. Portello, a Chicago builder, for 10 four-story flathouses he intends erecting on the south side of Chestnut street between Forty-third and Forty-fourth streets, at a cost of $300,000. Each house will measure 49 x 70 ft., of ornamental design, constructed of Indiana sandstone. There will be eight flats of six or seven rooms on each floor, and all the latest improvements, such as refrigerators and electrical cooking apparatus, will be installed in each suite.

John Megraw began work recently on 76 two-story houses in the Fortieth Ward, to cost $121,600. Nineteen, 15 x 42 ft. each, will be built on the north side of Reinhard street, west of Fifty-second street; 19 of the same size on the south side of Upland, west of Fifty-second street; 19 of the same dimensions on the north side of Upland, west of Fifty-second street, and 19 of the same size on the south side of Reinhard, west of Fifty-second street.

Pittsburgh, Pa.

The demand for medium priced houses, both for sale and rental purposes, has had the effect of turning attention anew to this field of investment, and as a result there has been a greater number of dwellings of this character erected or are now under way than at any time in the previous building history of the city. One operator who has made a specialty of building small houses for sale is said to have already erected and disposed of more than 200 during the present summer, and of one group of 100 houses which will be completed some time in November more than half have already been sold. The building movement continues on broad lines, and structures intended for business as well as dwelling purposes are under way in many sections of the city. Extensive church building plans are a feature of the situation and three new contracts for structures of this kind have recently been closed.

The building report for the month ending September 30 shows 215 new buildings to have been projected, 58 additions made and 87 permits issued for alterations and repairs calling for an estimated outlay of $1,238,550. Thus far the present year nearly $14,000,000 have been expended in realty improvements in the city, this amount being almost twice as much as last year, with the indications pointing strongly to the fact that the 12 months of 1906 will prove to be the banner building year. Extensive improvements are in progress in many sections of the city, especially in the residential districts, although several new office buildings in the down town portion of the city have been erected or are now in process of construction.

Quincy, Mass.

At a meeting of the principal building contractors in Quincy, held on Wednesday evening, September 19, an organization for the mutual protection of the building interests was formed under the name of "The Builders' Association of Quincy, Mass." Important business matters were discussed and future plans outlined. The officers chosen were J. W. Pratt, president; George E. Thomas, vice-president; Albert Nelson, treasurer, and C. C. Foster, clerk.

San Francisco, Cal.

Nearly one-third more construction work was undertaken in San Francisco during September than in the month preceding, and it is estimated that on October 1 approximately twice as many workmen were employed in building and in work preparatory thereto, than was the case on September 1. During September a total of 1030 building permits were issued for work aggregating $5,902,000 in value, as compared with 700 permits aggregating $4,200,000 during August and about 600 permits aggregating $3,500,000 during July. Of the permits issued during September 524 or nearly half, were for structures ranging in value above $1000. Of these 103 were for brick construction, estimated to cost $2,630,000; 7 were for large reinforced concrete buildings to cost a total of $418,000; 4 were for the reconstruction of large buildings damaged by fire and earthquake, to cost a total of $1,375,000, and the remainder was for wooden buildings and smaller reconstruction work. The remarkable feature of the situation is the small amount of wooden construction under way, as compared with the vast amount of brick, stone and concrete work being done and planned for the immediate future. Judging by the permits issued the total amount of the wooden building undertaken and of the smaller sort of reconstruction work is less than one-quarter of the whole, whereas in times before the fire this class of building would have amounted to at least three-quarters of the whole.

Labor is still very high, says our correspondent under date of October 8. In all cases it is as high as a month ago, and in several branches there have been advances of more or less importance since then. Materials, except in the case of lumber, have not advanced. Lumber has gone

up, and may go still higher, as the loggers in the North have advanced the price of logs very materially. Cement is much more plentiful than it was earlier in the year, and it can probably be had a little cheaper. Several important meetings have been held by property owners who hold property in the downtown district and who object to the advanced cost of construction, but so far these have resulted in little more than a determination to bring in more workmen as rapidly as possible. There is a great deal of talk about a "lumber trust," and the labor unions and property holders are in some cases threatening to postpone building. Conservative contractors and builders are, however, of the opinion that the high prices, in both materials and labor, are more the effect of demand and supply than of combinations; that the evils are not so much the high levels of prices as their instability, which makes it almost impossible to figure on work, and the scarcity of competent workmen; and that the remedy for the present state of affairs is rather in giving publicity to the present extremely high prices than in making a vain endeavor to force prices down. In fact, there are already signs that the problem is being solved to a certain extent at the expense of other Coast cities. During the last few weeks strikes in both Los Angeles and Oakland have resulted in several thousand carpenters and other builders migrating from those cities to San Francisco, and it is evident that the present wages are drawing in great numbers from all over the Coast as well as from the East and Middle West. Whether or not the San Francisco situation will work serious harm to the building industry in other Coast cities is a matter for speculation, but the idea of builders and architects here is that it is already doing so.

The question of housing the army of workmen now here, as well as those who are expected to be drawn here by the high wages, is still an interesting one. In view of the immense demand for dwellings it is causing some comment that so few dwellings, comparatively speaking, are being built. City property holders are evidently finding more immediate profit in the construction of large buildings and are consequently neglecting the building of residences. Apparently the immediate need for homes is to be settled largely in two ways. A great part of the population will be cared for in hotels and apartment houses, of which a large number are under way, and another large part will be quartered in the suburban towns, where both residences and apartment houses are being built to a very large extent. In Oakland, Berkeley, Alameda, Sausalito, San Rafael, Mill Valley and in the towns down the San Francisco peninsula residence building is very active. It is also evident from the record of the registration for the coming election that the outside towns are furnishing homes for the city's workers. The registration of these outside towns shows a big increase, while the registration here shows an unexpected falling off.

The Board of Supervisors of San Francisco has appropriated $50,000 for the rebuilding of fire houses burned in the fire of last April. Many of the fire companies have already been taken care of temporarily, but the rapid rebuilding of the burned district makes it necessary that some provision be made for fire houses in that section of the city.

In addition to the school buildings planned last August, the San Francisco Board of Education has planned the construction of 12 additional schoolhouses, at a total cost of $1,045,000. These include one polytechnic high school building, of class "A" construction, to cost $375,000; one 18-room brick building, to cost $119,000; two 12-room brick buildings, to cost $81,000 each; four eight-room brick buildings, to cost $54,000 each; one 12-room frame building, to cost $56,000, and three eight-room frame buildings, to cost $39,000 each. These buildings, in addition to those planned in August, cover the entire provision of the recent bond issue except two high school buildings.

The plans for the San Francisco temporary city hall have been completed. They call for a two-story frame building, with frontages of 389 ft. 9 in. on Hayes street and on Linden avenue and of 120 ft. on Van Ness avenue and on Franklyn street, to be erected within four months, at a cost of $80,000. The building will have an exterior of metal lath, covered with cement and ornamental stucco work. Each story will be 16 ft. in hight. The main entrance will be in the center of the Hayes street front. On the ground floor are to be the offices of the Mayor, Auditor, Tax Collector, Treasurer, Assessor, clerk's office and committee rooms for the Board of Supervisors, Fire Commission, Board of Health, Election Commission, Board of Public Works and its departments, Department of Electricity, telephone exchange and janitor's rooms. Fireproof vaults will be arranged under the offices needing them and under the sidewalks. The second floor of the structure will be occupied by the offices of the Board of Education, Superintendent of Schools, City and County Attorney, the Public and Law Libraries, County Clerk, justices' clerks, five justices' courts, reporters' rooms, Grand Jury and Trial Jury rooms, and nine law courts for the Superior Judges. All the judges will be provided with private chambers directly connected with their courtrooms.

St. Paul, Minn.

A comparison of the building figures for St. Paul for September of this year and last shows a gain of over 80 per cent. for the month just past, the exact figures being $790,150 for September, 1906, and $448,485 for September, 1905. The gain for the nine months ending September 30 of the current year is approximately $500,000, as compared with the cost of the buildings begun during the corresponding period of last year, the exact figures being $5,393,437 and $4,938,055, respectively.

Construction work in St. Paul during the past month, as during the preceding three months, has been badly hampered by the inability of the contractors to procure building material of various kinds. When the stringency first became apparent it was structural steel only that was seriously affected, and for a while none but the largest buildings of the warehouse and business block type were involved in the delay that followed. Later on the builders found it increasingly difficult to get their orders filled for the trim, and the result was that the delay in building was extended forthwith to the more numerous class of ordinary store and office structures, not to speak of the higher class of flat buildings and dwellings. At the present writing the paucity of building material has reached the point where it is well-nigh impossible to procure common brick and building stone promptly, and the difficulty in getting anything in the way of lumber, except the coarser grades, is so great that a large number of prospective builders who were looking forward to the completion of their work this year have been forced to change their plans.

The fact that building work on many half completed structures has been practically suspended for the present has not as far as can be learned had the effect of throwing the laboring men out of work. As a matter of fact, labor in general has never been so steadily employed during the entire building season as at present, and the indications are that work will be plentiful for both skilled and unskilled labor throughout the rest of the fall and much of the winter.

Nearly every railroad that has its terminals in St. Paul and Minneapolis is engaged in the business of opening up new towns along the lines that have either just been completed or are about to be completed. In many cases the railroad company is undertaking to supply the demand for carpenters and other builders in the new towns, and the new role that sundry of the roads are assuming as quasi-employment agencies is having the double effect of relieving the Twin Cities of what might otherwise prove to be a congested labor market, and at the same helping materially in the building boom that at the present time includes nearly every town in the Northwest. The extent of the work that is being done by the railroads in this matter of building up new towns along their various lines is shown by the fact that a single road running into Minneapolis and St. Paul is at present engaged in the work of building 25 new towns along one of the branch lines that is on the point of completion.

Toronto, Can.

The wave of building activity which has been sweeping over the United States appears to have affected this section of the world, if one may judge by the statistics which are available, covering the value of building improvements from the first of the year up to the middle of September. As compared with the corresponding period of last year the current volume of operations is far in the lead, the figures being $9,120,683 and $7,588,934, respectively. In the corresponding period of 1904 the value of the improvements for which permits were issued was $4,165,103.

At the rate permits are now being issued the year 1906 will go far ahead of any of its recent predecessors in the value of its building improvements.

Notes.

Building operations in Denver, Col., are being conducted upon an increasing scale, and for the month of September the value of the improvements record an advance of nearly 60 per cent. as compared with the same month last year. The figures for the two periods are $386,000 and $232,455, respectively.

The Builders' Exchange of Alton, Ill., has just been incorporated for the purpose of advancing the building interests in that community, the incorporators being Oscar Gent, C. B. Davis and J. C. Wuellner. The trustees for the ensuing year are Samuel McClure, W. C. Beiser and Lathy Waggoner.

According to the report of Building Inspector T. P. McMahon, made to the Board of Public Safety at its meeting on the afternoon of October 2, building permits calling for improvements valued at $1,835,371 were issued during the fiscal year ending October 1 in the city of Chattanooga, Tenn. The inspector pointed out in his report that new building laws were needed in order to meet the growing demands of the city, and acting upon his suggestion the board passed a motion requesting the appointment of such a committee.

New Publications.

Laying and Finishing Hardwood Floors. By Frank G. Odell; 50 pages. Size, 5½ x 8 in. Numerous illustrations. Bound in board covers with attractive side title. Published by the David Williams Company, 14-16 Park place, New York City. Price, 50 cents, postpaid.

Hardwood floors are becoming more and more a requisite of the modern dwelling, whether it be the city residence or the suburban home, and much attention is therefore being given to the best methods of laying and finishing them in order that satisfactory results may be obtained. The author of the above little work has had a somewhat extended experience in the better grades of modern floor finishing, and what he has to say throws a great deal of light upon many phases of the subject, while calling attention to points which are often ignored or given but scant attention by those doing work of the character indicated. Within its covers the carpenter and building mechanic who wants to know just the way a floor should be finished is told how to do the work in the most satisfactory manner. Not the least important of the matter presented is the chapter on estimating work of this kind, while the prices which are given are based upon different jobs of work covering a period of years. The entire presentation of the subject is such as to appeal to the practical man, and the little work will be found an important contribution to the literature bearing upon this part of the builder's work.

The Building Mechanics' Ready Reference. By H. G. Richey, Superintendent of Construction of United States Public Buildings; 226 pages. Size, 4½ x 7 in. Illustrated by means of 119 figures and diagrams. Bound in morocco covers. Published by John Wiley & Sons. Price, $1.50.

The author states that this little volume is intended to be just what its title implies—a ready reference manual for the use of the carpenter and the woodworker, a book to which he can refer at any time to refresh his memory, or to assist him in any branch of his work. No complicated diagrams are given, but all illustrations are presented with as few lines as possible. In preparing the work the effort has been made to place all information so far as possible in tabular form, so that the mechanic using the book will be able to make "short cuts" in performing his work.

The subject matter is divided into six parts, the first of which has to do with short methods of laying out work, roof framing, laying out arches, &c. Part II is made up of tables of interest and value to the mechanic. In Part III the author discusses short cuts and useful problems for everyday use, tells how to shingle hips and valleys, explains the steel square and tells what constitutes a day's work for a good carpenter. Part IV is devoted to lumber measure, strength of wooden and steel beams, columns, &c. Part V considers the strength of various materials used in construction, capacity of tanks and cisterns and miscellaneous data, while the last section of the little work is taken up with various hints and receipts, rules for painting, wage tables, &c. A comprehensive index will be found of convenience.

Attached to the inside of the back cover is a book for keeping the time of the workmen on a job.

The Steel Square as a Calculating Machine.—By Albert Fair; 82 pages. Size, 5 x 7½ in. Illustrated with numerous diagrams. Bound in board covers. Published by the Industrial Publication Company. Price, 50 cents postpaid.

This little work, as its title indicates, is made up of a number of simple directions for using the ordinary carpenter's steel square for the solution of complicated calculations that occur in the everyday practice of carpenters, builders, electricians, masons, stone cutters, plumbers, gas fitters, blacksmiths, lumber dealers, tinsmiths, &c. The matter has not been prepared with a view to meeting the requirements of graduates of technical schools or even well read workmen of experience, but with a view to appealing more particularly to the ordinary workman and to the beginner who is desirous of making progress in his chosen calling. From this it will be seen that the subject matter is presented in a most elementary style, the common language of the shops being used instead of the precise terms of the mathematician. The author points out that while almost everything presented within the covers of the little work has been published over and over again by various writers he is not aware that any of them has put it into such simple shape.

The text is comprised in ten chapters, the first of which relates to hints and cautions regarding the course to be followed by the mechanic. The second consists of a few simple explanations for the benefit of those who have had little or no technical education, while the third outlines the requisites in the selection of a steel square. The chapter which follows considers the graphical as compared with the arithmetical method of calculation, after which attention is given to lines, surfaces and solids, right angles and right angle triangles, problems in proportion and polygons. An important feature of the work is found in the description of the markings which occur on steel squares, the point being made that it is important not only that the square should be of the right kind but that it should be of first-class quality. The concluding chapter relates to the different styles of finish of a square, this being not only a matter of taste but of durability as well. The entire make up of the little work is well considered and the matter has been handled in a way to render it an important contribution to the literature of the subject.

A California Railroad Depot.

The Southern Pacific Railroad Company is preparing to build a new depot at the college town of Berkeley across the bay from San Francisco, which will be especially designed to harmonize with the college architecture. The building, of French renaissance, consists of two main sections connected by an arcade. It is 190 ft. in extreme length and 41 ft. wide. An arcade 11 ft. wide extends along the entire west front and both ends of the building. It will be constructed of red pressed brick with light buff terra cotta trimmings and copper roof and cornice. The arcade is in the Doric order, made of reinforced concrete covered with terra cotta. The entablature and pediment carry out the same color scheme. The north wing of the building contains a smoking room, baggage room, etc. The south wing contains the waiting room, retiring room and ticket office. The interior of the waiting room, which is 45 x 25 ft. with a 23-ft. ceiling, is to be finished in light buff brick with terra cotta trimmings and to have an elaborate terra cotta fireplace with an ornate hammered copper hood at one end. The walls of the waiting room will be finished in paneled designs by a famous sculptor, executed in terra cotta by California manufacturers. The wood finish throughout will be of eastern oak; special designs in electric light fixtures will be introduced. Between the two wings of the building will be a grass plot surrounded by an ornamental fence, cement walks, &c. The surrounding grounds will also be laid off with lawns and cement walks.

The pattern drafting classes of the Mechanics' Institute of the General Society of Mechanics and Tradesmen, 16 West Forty-fourth street, New York City, opened on the evening of October 1. The course in pattern drafting, as before, is in charge of George W. Kittredge, who is more or less familiar to readers of this journal as an author of the New Metal Worker Pattern Book and an occasional contributor on various interesting topics. The facilities provided last year are again available, accommodating a class of 84, divided into two parts, 42 receiving instruction on two alternate evenings each week. While classes have already been filled, applications will be kept on file so that as vacancies develop they may be readily filled. It usually happens that there are withdrawals throughout the season, which closes in April. The instruction is free.

Aggregates for Concrete Mixtures of Various Proportions.

One of the questions constantly arising in connection with the rapidly growing use of cement concrete is the amount of cement, sand and stone required for mixtures of various proportions. The quality of the completed work depends so largely upon a knowledge of the proper mixture that the builder who is called upon to use in his foundations, walls, walks or for other purposes a large amount of concrete will be interested in the following table, which appeared in a recent issue of *Concrete*. The figures cover a wide range of application and will be found exceptionally convenient for reference:

Concrete with gravel ¾ in. and under.					
Proportions of mixture.			Required for 1 cu. yd.		
Cement.	Sand.	Stone.	Cement. Bbls.	Sand. Cu. yds.	Stone. Cu. yds.
1	1	2.0	2.72	0.41	0.83
1	1	2.5	2.41	0.37	0.92
1	1	3.0	2.16	0.33	0.98
1	1.5	2.5	2.16	0.49	0.82
1	1.5	3.0	1.96	0.45	0.89
1	1.5	3.5	1.79	0.41	0.96
1	1.5	4.0	1.64	0.38	1.00
1	2.0	3.0	1.78	0.54	0.81
1	2.0	3.5	1.66	0.50	0.88
1	2.0	4.0	1.53	0.47	0.93
1	2.0	4.5	1.43	0.43	0.98
1	2.5	3.5	1.51	0.58	0.81
1	2.5	4.0	1.42	0.54	0.87
1	2.5	4.5	1.33	0.51	0.91
1	2.5	5.0	1.26	0.48	0.96
1	2.5	5.5	1.18	0.44	0.99
1	3.0	4.0	1.32	0.60	0.80
1	3.0	4.5	1.24	0.57	0.85
1	3.0	5.0	1.17	0.54	0.89
1	3.0	5.5	1.11	0.51	0.93
1	3.0	6.0	1.06	0.48	0.97
1	3.5	5.0	1.11	0.59	0.85
1	3.5	5.5	1.06	0.56	0.89
1	3.5	6.0	1.00	0.53	0.92
1	3.5	6.5	0.96	0.51	0.95
1	3.5	7.0	0.91	0.49	0.98
1	4.5	6.0	0.95	0.58	0.87
1	5.0	6.5	0.91	0.55	0.90
1	4.0	7.0	0.87	0.53	0.93
1	4.0	7.5	0.84	0.51	0.96
1	4.0	8.0	0.81	0.49	0.98
1	5.5	8.0	0.74	0.57	0.91
1	5.0	9.0	0.70	0.53	0.96
1	6.0	9.0	0.65	0.59	0.89
1	6.0	10.0	0.62	0.56	0.93
1	7.0	11.0	0.54	0.51	0.91
1	7.0	12.0	0.52	0.55	0.95

Concrete with 2½ in. stone.					
Proportions of mixture.			Required for 1 cu. yd.		
Cement.	Sand.	Gravel.	Cement. Bbls.	Sand. Cu. yds.	Gravel. Cu. yds.
1	1	2.5	2.10	0.32	0.80
1	1	3.0	1.89	0.29	0.86
1	1	3.5	1.71	0.26	0.91
1	1	4.0	1.55	0.24	0.94
1	1.5	3.0	1.71	0.39	0.78
1	1.5	3.5	1.57	0.36	0.83
1	1.5	4.0	1.46	0.33	0.88
1	1.5	4.5	1.34	0.31	0.91
1	1.5	5.0	1.24	0.28	0.94
1	2.0	3.5	1.44	0.44	0.77
1	2.0	4.0	1.34	0.41	0.81
1	2.0	4.5	1.26	0.38	0.86
1	2.0	5.0	1.17	0.36	0.89
1	2.0	6.0	1.03	0.31	0.94
1	2.5	4.0	1.24	0.47	0.75
1	2.5	4.5	1.16	0.44	0.80
1	2.5	5.0	1.10	0.42	0.83
1	2.5	5.5	1.03	0.39	0.86
1	2.5	6.0	0.98	0.37	0.89
1	2.5	7.0	0.88	0.33	0.93
1	3.0	5.0	1.03	0.47	0.78
1	3.0	5.5	0.97	0.44	0.81
1	3.0	6.0	0.92	0.42	0.84
1	3.0	6.5	0.88	0.40	0.87
1	3.0	7.0	0.84	0.38	0.89
1	3.0	7.5	0.80	0.37	0.91
1	3.0	8.0	0.76	0.35	0.93
1	3.5	6.0	0.88	0.46	0.80
1	3.5	6.5	0.83	0.44	0.82
1	3.5	7.0	0.80	0.43	0.85
1	3.5	7.5	0.76	0.41	0.87
1	3.5	8.0	0.73	0.39	0.89
1	3.5	8.5	0.71	0.38	0.91
1	3.5	9.0	0.68	0.36	0.92
1	4.0	7.0	0.77	0.47	0.81
1	4.0	7.5	0.73	0.44	0.88
1	4.0	8.0	0.71	0.43	0.86
1	4.0	8.5	0.68	0.42	0.88
1	4.0	9.0	0.65	0.40	0.89
1	4.0	9.5	0.63	0.38	0.91
1	4.0	10.0	0.61	0.37	0.93
1	5.0	10.0	0.57	0.43	0.87
1	5.0	12.0	0.51	0.38	0.92
1	6.0	12.0	0.48	0.44	0.88
1	6.0	14.0	0.43	0.40	0.92
1	7.0	14.0	0.42	0.44	0.38
1	7.0	16.0	0.38	0.40	0.92

◆

Manufacturers' Catalogues Wanted.

We have a letter from a foreign correspondent who desires to receive copies of catalogues and prices from manufacturers of asphalt roofings, hinges, bath fittings, builders' hardware, pumps, window fixtures, &c. The matter should be addressed M. N. Demirjian, care U. S. Consulate, Alexandretta, Syria, via French mail.

◆

AMONG the many interesting articles in the October number of *Country Life in America*, which is the annual housebuilding number, is one telling how to build a country house (at various prices), what to put into the house and the prevailing architectural taste. The supreme feature of this issue is the selection of perfect country houses by four of the leading architects of the United States. Wilson Eyre and Charles Barton Keen of Philadelphia; John M. Carrère of New York, and Guy Lowell of Boston, have combined to select 23 representative country houses that out of their wide experience have appealed to their artistic taste. These houses were built by many different architects, they are geographically diversified, they range from a cost of $3500 to a cost of $50,000. No such collection of beautiful country houses has ever been so authoritatively garnered. The selective taste of these gentlemen is catholic; Colonial, French, Italian, all the great dominant styles are represented. "Glass Rooms and Sun Parlors" tells how to sit outdoors all the year round. George Leland Hunter contributes another of his quotable articles—this time on "Georgian Furniture." Walter A. Dyer shows why the expense of housebuilding varies in different sections of the country, and gives a basis for estimating the cost. "Why Not a Bungalow," is a warm hearted tribute to the most attractive type of small country house. Professor Henry Van Dyke collates "Songs of Nature" appropriate for the month. "The Country Home Reminder" will give the country home dweller four more successful weeks. Other features of this rich number are "Outdoor News and Discoveries," "The Joys and Woes of Well Driving," "The Unburnable Country House," "The $10,000 Country Home," "What Proper Remodeling Will Do," "The Essential Features of a Well Planned Cottage," and "Plumbing for a Country House."

ONE of the features of the lumber world this year has been an unusual activity in walnut. Under the stimulus of higher prices than were ever known before millmen have been scouring the woods for everything that looks like a walnut tree, and even the most trashy of this stock seems to meet with ready sale at good prices, while the few fine logs that have been secured have brought pretty fancy figures. The thing to wonder about right now is where are we going to get walnut in the future?

CONTENTS.

Editorial—

Correspondence—

Novelties—

THIS IS THE AGE OF THE

METAL SHINGLE

PAINTED TIN
GALVANIZED TIN

INFLAMMABLE WOOD SHINGLES, HEAVY SLATE, BRITTLE TILE AND UNSIGHTLY PAPER OR TAR HAVE SEEN THEIR DAY.

And the reason is that the NEW CENTURY METAL SHINGLE is the natural evolution of the shingle question.

They are fire proof. They are light. They are unbreakable. They are artistic—and then beyond that are qualities of durability, strength, beauty and quick adjustment—all its own.

Note the appearance of just one building roofed with NEW CENTURY METAL SHINGLES and then compare it with the cheap, common kind done in wood, slate, paper or tar.

And then figure on this—that they're cheaper than wood, cheaper than anything when you figure all the saving points involved—insurance, protection, etc.

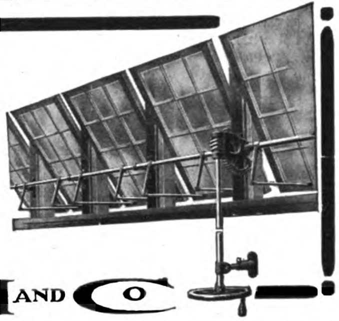
NEW CENTURY SHINGLES are handsome embossed design, the lock is simple, easy, perfect.

Don't fail to get the book, No. 25, we send you free, and post up on the roofing question, comparative costs, estimates, designs, etc. Address,

CHATTANOOGA ROOFING & FOUNDRY CO., Chattanooga, Tenn.
New York Office, 440 Greenwich Street.

H AND C

THERE'S PLENTY OF CHEAP SASH OPERATING APPARATUS

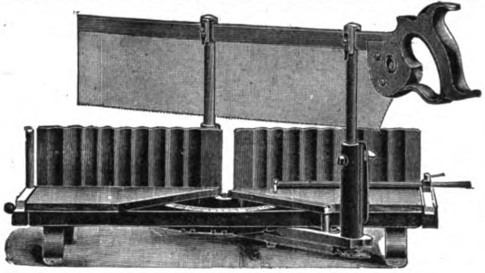


the kind that's made of light materials—the worms in the gear not machine cut—the bearings not finely adjusted. If you want a good thing to do a good job, you've got to pay for it. Ours is a good thing at the right price for a good thing.

HITCHINGS AND COMPANY,
GREENHOUSE DESIGNERS AND BUILDERS,
Manufacturers of Heating and Ventilating Apparatus.
1170 Broadway, - - - NEW YORK.

H AND C

GOODELL MITRE BOX



MADE ENTIRELY OF STEEL. NO MORE BREAKING.
FIRST IN QUALITY AND IMPROVEMENTS.

AUTOMATIC STOPS FOR HOLDING UP SAW.
CORRUGATED BACKS. GRADUATED.
GAUGE FOR DUPLICATE CUTS and many other features.

If you want the best you will take no other.
Send for Circular K.

GOODELL MFG. CO., Greenfield, Mass.

The Carpenter's Guide

By A. F. Barker

A Manual of Terms Used in Architecture, Carpentry and Building

A HANDY book of terms and concise definitions arranged in alphabetical order—includes reference to the features of the various architectural styles.

178 Pages
Flexible Cloth Cover
75 Cents, Postpaid

David Williams Co.
14-16 Park Place, New York

Successful Draftsmanship

taught personally and individually by

Chief Draftsman

of large concern. I guarantee to teach you first-class drafting-room knowledge and experience in a few months' home study. Furnish all tools and high-grade position free when competent. Address

Chief Draftsman, Div. 3,
ENGINEERS' EQUIPMENT CO., Chicago

A NEW BOOK

Concrete-Block Manufacture Processes and Machines

By H. H. RICE

152 Pages 46 Half-tone Cuts
Bound in Cloth
Price $2.00 Postpaid

DAVID WILLIAMS COMPANY
14-16 Park Place - - - NEW YORK

NOVELTIES.

Wagner's Shingle Gauge.

Illustrated herewith we show the Wagner No. 60 shingle gauge, a device gotten up for convenience and saving of time in laying shingles. The tongue of the gauge slips underneath the shingle and the teeth at the lower end of the tongue catch into the shingles, preventing the device slipping out, but not interfering with placing the article in position in a moment's time or taking it out of position when through using. A curved handle is provided for convenience in the latter operation. Fig. 1 shows the article itself and Fig. 2 illustrates it when placed in position. The top part of the gauge is provided with a thumb nut and an adjustable gauge for adjusting the different distances which shingles are laid to the weather, giving an adjustment of from 4 to 6 in. In shingling a roof two of these gauges are used in connection with a straight edge, as shown in Fig. 3, preferably 4 in. wide. Either a regular straight edge or any straight board from ½ to 1 in. thick can be used. The two gauges are then placed in position, one at either end of the straight edge, and adjustment is made to whatever distance the shingles are to be laid. The shingles are laid with the butts coming down against the straight edge, and when a row is finished the gauges are quickly withdrawn and replaced for the next row. The use of a chalk line or a nailed straight edge is thus unnecessary. The device is put up one-half dozen in a box and is manufactured by the Wagner Mfg. Company, Cedar Falls, Iowa.

Novelties.—Wagner Shingle Gauge No. 60. —Fig. 1.—General View of the Device.

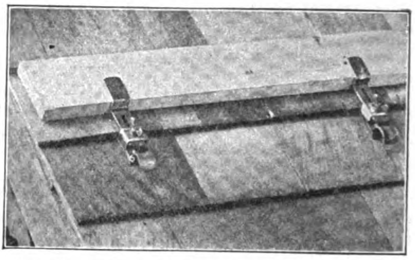


Fig. 3.—Shingle Gauge in Connection with Straight Edge.

Victory for Fox Machine Company.

The Supreme Court of Michigan has just rendered a decision which establishes a precedent for the canceling of contracts where parties agree to energetically push the sale of certain productions and then fail to do so. The case was that of James B. Stone *vs.* the Fox Machine Company, *et al*, and involved dealings between the parties commencing in 1890 and continuing until 1895. In 1890 Mr. Stone took up the sale of the Fox Universal trimmer in Great Britain and Europe, having his headquarters in London. The business continued under varying arrangements until 1899, when an agreement was entered into whereby Mr. Stone was to continue the sale of trimmers in Great Britain and Europe and prosecute the business faithfully in accordance with previous experience. In May, 1902, the business of the Fox Machine Company was taken over by the Fox Typewriter Company, but no mention was made of the Stone agreement, the manager of the new company assuming that it had expired, but continuing sales to Stone. The business under this contract was not prosecuted satisfactorily to the Fox companies, who complained that Mr. Stone was neglecting the business on the Continent of Europe and failing to prosecute it faithfully and that therefore he was not entitled to exclusive rights in that territory. In consequence some sales were made by them direct to wholesale companies in Europe. Mr. Stone, claiming that he had exclusive right to the sale of the trimmers in Europe until the contract was canceled, brought suit against the company and obtained a preliminary injunction restraining the Fox Typewriter Company from advertising, quoting prices or selling trimmers on the Continent of Europe. The case was tried in the Circuit Court at Grand Rapids and a decree was rendered canceling the contract and awarding damages against all the defendants. The case was appealed to the Supreme Court, which reversed the decision of the lower court and held that the complainant did not use due diligence as the contract required, and that his failure to obtain larger business was due to his own acts. This decision is a victory for the Fox Company, as its purport is to cancel all contracts which heretofore existed between the company and its former London agent, and assesses the cost of litigation against the complainant.

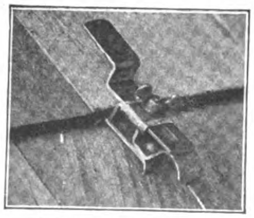


Fig. 2.—Shingle Gauge Placed in Position.

The Edwards Perfect Hip Shingles.

The Edwards Mfg. Company, Cincinnati, Ohio, is bringing to the attention of architects and builders the hip shingle shown in Fig. 4. The shingle is made for hips of roofs and is intended to take the place of plain tin strips, wood or metal rolls. The shingles are 4 x 9 in., made of tin, galvanized iron and copper. The hip shingles can be used in combination with the Edwards metal shingles with very pleasing effects. The latter are made in three sizes, 7 x 10, 10 x 14, 14 x 20 in., of pure sheet copper, tin plate, painted or galvanized.

Fig. 4.—The Edwards Perfect Hip Shingle.

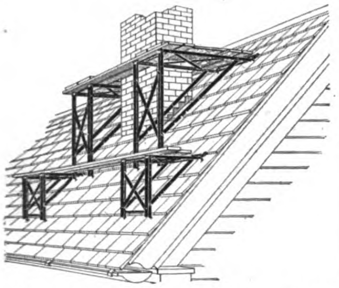
Miracle Cement Building Blocks and Machines for Making Them.

We have before us a copy of an attractive publication of 114 pages in which are set forth at length the merits of the machines for turning out Miracle cement concrete building blocks, sewer pipe and tile, cement brick, &c., issued by the Miracle Pressed Stone Company, Minneapolis, Minn. The work is profusely illustrated and is bound in paper covers of appropriate design. In the descriptive text special attention is called to the double staggered air space cement building blocks which it is pointed out give a wall with two air spaces instead of one, and a much stronger construction by far than two walls forming one continuous air space. The use of these blocks is said to render a building frost and moisture proof, keeping it warm in winter and cool in summer. Evidence of the fireproof qualities of these blocks is presented at some length, as are also the various steps in the construction of the blocks themselves. The different stages are illustrated by means of half-tone engravings, figures of cost are shown, and a number of pages are devoted to condensed facts showing the advantages of these blocks as a building material to builders, contractors and owners. The illustrations also include 69 cuts of the various faces, styles and sizes of blocks which can be turned out by means of one of the outfits furnished by the company. Reference is made to a variety of special molds for belt courses, cornices, columns, balusters, &c. A special department solely for the accommodation of its patrons and friends has been added by the company, with a view to furnishing plans and specifications for all kinds of cement buildings. Numerous half-tone illustrations of buildings erected from Miracle blocks are scattered through the work, together with pictures of block machines and their method of operation. Attention is also invited to concrete brick machines and their product, also to Miracle colors and the way to use them. Hand power concrete mixers are an interesting feature of the work, as are the tools and appliances employed in the construction of sidewalks. The entire make-up of the work is such as to prove of unusual interest to architects and

builders, and we understand that copies will be furnished to any one who may apply for 25 cents each, postpaid.

Kingston's New Roofing Bracket.

One of the latest conveniences in the way of a roofing bracket for the use of masons in building or repairing chimneys or for the use of carpenters or other mechanics having any work to do on pitch roofs, is the device which is being introduced to the attention of the trade by the Kingston-Hall Company, 550 Franklin street, Cambridge, Mass., and which is illustrated herewith. The brackets can be adjusted to any pitch of roof; are constructed of angle steel, very strong, and will sustain five times the weight that will probably ever be required of them. A set consists of four brackets as indicated in Fig. 5, there being two long and two short ones. The claim is made that as they are adjustable to any pitch of roof they can be put up or taken down in a very few minutes. In doing odd jobs of repairing, such as patching or topping off a chimney, it is a well-known fact that it requires as a general thing a much longer time for the mason to erect his staging than it does to do the actual work. The value, therefore, of an adjustable staging of the nature illustrated in Figs. 5 and 6 will be readily appreciated. A view of one of the brackets as it appears when folded ready for transportation from one job to another is shown in the lower part of Fig. 6. Its dimensions are 42 in. long, 10 in. wide and 6 in. deep. In a test made by Prof. Edward F. Miller at the Massachusetts Institute of Technology, a bracket was placed on a made up roof having a pitch of 45 degrees and loaded with a weight of 4300 lb. without its breaking, the test not being continued to the point of failure.



Novelties.—Kingston's New Roofing Bracket.—Fig. 5.—Showing the Brackets in Position for Use.

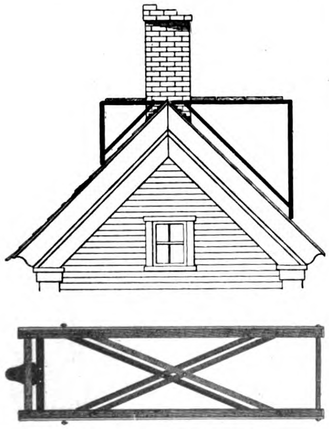


Fig. 6.—View of Bracket Folded and Also in Use on Both Sides of Ridge.

Voltax Compound.

The Electric Cable Company, Bridgeport, Conn., and 17 Battery place, New York City, is manufacturing Voltax, which is described as a waterproofing compound and preservative of wood and metal, as well as a good insulating material. The manufacturer states that the compound is impervious to moisture, acids, sulphurous gases and alkalies, that it will not freeze or crack, retains its elasticity, will not corrode, prevents electrolytic action, dries out in the same time as required for ordinary paint, adheres to glass, porcelain and other smooth surfaces, and maintains uniformity in quality. Voltax may be used for painting stonework to keep moisture from sweating through, and on steam and cold water pipes as a preventive of moisture. As a paint for furnace doors and stacks it is said to withstand an exceedingly high temperature.

Sheet Metal for Interior Decorations.

The widely increasing use of sheet metal for both the utilitarian and decorative purposes on the outside of buildings has been frequently discussed, and the progress which has been made from time to time has been observed by sheet metal workers generally. Within a few years the more general use of stamped steel ceilings has come about for interior decorations, and now it is not only not uncommon to find ceilings and side walls of sheet metal, but we see doors and window frames covered with sheet metal, as well as coves and cornice moldings of sheet metal. This has largely been brought about because of the numerous designs which could easily be worked up, as well as the indestructibility and comparative cheapness. The use of sheet metal for office fixtures, such as desks, letter files and bookcases, is now becoming quite general in offices where records are kept for permanent use, such as county clerks' offices and the like, and business offices are even adopting this form of construction. A new field apparently has been opened by some sheet metal workers and in the accompanying half-tone, Fig. 7, is reproduced an illustration of a sheet metal mantel made by the Duluth Corrugating & Roofing Company, Duluth, Minn. This mantel is made entirely of sheet metal except for the mirror and the fireplace fixtures, and although the company has placed but a few of these mantels in residences they are giving entire satisfaction. They are finished in numerous styles and can be finished so that it is hard to distinguish them from mahogany, marble or tile. They can be made so they can be moved at any time with little trouble. Mantels of this description are slightly cheaper than the same style in wood, and the freedom from fire, particularly where a grate is used underneath, is a point in their favor.

Fig. 7.—A Sheet Metal Mantel.

Catalogue of Stamped Steel Ceilings.

The additions which are constantly being made to almost every line of stamped sheet metal ware for interior decoration render it necessary that new catalogues be issued frequently. Several particularly pleasing designs in side walls and ceilings of the Gothic type, which combined with field plates and borders of the same order of decoration make particularly pleasing designs for church interiors, are shown in a recent catalogue of the New York Iron Roofing & Corrugating Company, First and Washington streets, Jersey City, N. J. A new idea in the way of church decorations is entire brackets, either to cover existing brackets in the woodwork or to add to the attractive effect. These brackets can be made in a number of special designs, corresponding to the size and character of the building in which they are installed. A number of moldings of varying widths are also shown, as well as coves. Some excellent designs of deep stamping are illustrated in center pieces, and a line of architectural ornaments is also shown. These vary from small ones 2½ in. square or 3 in. in diameter to large stampings 11 in. in diameter. A number of *bas relief* panel plates are shown, as well as frames for all kinds of plates. A large variety of zinc or copper brackets as well as capitals are also shown, which are not only used for interior

work, but also are largely drawn upon for cornice manufacture. A number of pages in the back of the book are devoted to showing interiors of sheet metal, including churches, assembly halls and banks.

Keyhole Saw.

The Bridgeport Hardware Mfg. Company, Bridgeport, Conn., is the maker of the Keyhole saw illustrated in Fig. 8 of the cuts. It has a handle made entirely of steel and said to be unbreakable, with a ball shaped end especially designed to fit the hand. The handle is blued steel or gun metal finish and combines a wrench for ¼ and ⅝ in. nuts. The blade is 7 in. long, made of cast steel polished bright and declared to be first class in every respect. The special clamp attachment for holding the blade in the handle is a distinctive feature of this tool, furnishing a means of locking the blade securely or releasing and removing it instantly when desired. The saws are packed one-half dozen in a box, 24 dozen in a case.

Novelties.—Fig. 8.—Keyhole Saw.

Automatic Miter Clamp.

Hammacher, Schlemmer & Co., Fourth avenue and Thirteenth street, New York City, are offering the Automatic Miter Clamp shown in Fig. 9 of the accompanying cuts. It is designed for the use of woodworkers and sash, blind and door manufacturers, and is described as light, compact, effective, inexpensive and practically indestructible. The makers state that the clamp takes any width or thickness of casing, whether sprung or flat, and sets in place and clamps a miter in less time than it takes to make a full turn of a screw. They also explain that it has no intricate parts to get out of order and requires no adjusting, being always in position.

Fig. 9.—Automatic Miter Clamp.

Suggestions Regarding "Yale" Padlocks.

A scheme for calling the attention of the trade to the merits of Yale padlocks has been in force for some time past by the Yale & Towne Mfg. Company, 9 Murray street, New York City, and some reference to it in these columns may not be without interest. The company has prepared a series of pamphlets and leaflets which are distributed free on application, new literature being constantly added to the assortment as the new goods brought out may seem to require it. The appeal is made more particularly to the dealer handling lines of builders' hardware, and his name and address is printed upon the pamphlets when so desired. The assortment of literature consists among others of a little work entitled "A Book About Padlocks," enumerating 52 uses with illustrations of most of them, while another, known as "The Little Black Box," is the story of a marriage and the trouble that grew out of a mysterious black box. The company has gotten out a number of stories calculated to hold the attention of the reader, but this one is considered the best, while the size and style permit of its being issued in large quantities at a reasonable cost. The leaflets which are being sent out briefly refer to the merits of some of the leading styles of padlocks, with suggestions that fully explain themselves. The printing is in a most neat and effective style, being in colors upon a tinted paper, all tending to prove attractive to the reader who may be interested in padlocks and some of their many uses.

Triple Drum Sander.

Those of our readers who have occasion to do fine surfacing of panels, doors, &c., upon any considerable scale are likely to be interested in a triple drum sander which has just been placed upon the market by the J. A. Fay & Egan Company, 221 to 241 West Front street, Cincinnati, Ohio, and which is illustrated in Fig. 10. The statement is made that by reason of its great success the machine has been christened "The Conqueror." The three drums are made of steel and carry sandpaper of different grades, depending upon the work to be done. Each drum has an oscillating motion which it is claimed insures a uniform surface without lines or marks which often result when the motion is direct. The drums can be entirely removed when desired, and any workman can re-cover them without trouble, giving the paper the proper tension in a short space of time. There are eight feed rolls, four above and four below the platen, driven by a train of heavy expansion gearing. The upper rolls are mounted directly over the lower ones. The feed is governed by a double belt tightener operated by a hand lever. A brush attachment cleans the material as it passes through, so that there is no extra work required before painting or varnishing. The machine has a capacity for work from 30 to 80 in. wide and up to 8 in. thick.

Coltrin Concrete Mixer.

Among the many devices at present on the market for mixing concrete, which material is so extensively employed just now in connection with building construction and for other purposes, mention may be made of the apparatus manufactured by the Knickerbocker Company, Liberty street, Jackson, Mich. It is known as the Improved Coltrin Concrete Mixer, with double drive and automatic cement feed, and is shown in general view in Fig. 11 of the illustrations. The frame of this mixer is constructed of 2¼ x 3¾ in. maple, reinforced with iron corner brackets. The mixer stands 6 ft. long, 3 ft. wide and 4 ft. high, and is mounted on three wheels with 3-in. face, as shown in the picture. The weight is about 800 lb., but the arrangement of parts is such that it can be readily handled by one man. The shafting is 1¼ in. cold rolled steel. The mixing is done in a shell made of No. 10 gauge steel, with bottom rolled to the shape of a half circular cone, in which revolve blades extending on a spiral from the head to the foot of the machine, where the mixture is discharged. A view of these mixing blades, the discharge end being at the right, is presented in Fig. 12. The shell is suspended on suitable bearings at the front and rear sides, and can be raised or lowered as well as moved horizontally in order to change its proximity to the mixing blades. An automatic device for feeding the cement has been added, so that when the cement is placed in the hopper holding a little over two sacks; it is measured out by a feed roll with pockets that can be changed to dump from 2 to 1 up to 8 to 1, or any portions desired. The trip of the feed roll is made by the shovel or the material as it is cast into the mixer. The mixing is continuous while the machine is in operation and in plain sight all the time. The mixer is built for hand power, and its capacity as such is 7 to 9 cu. yd. per hour, the 9 yd. per hour having been averaged on a day's run. It can be operated by an engine if the extent of the work warrants it, with a capacity of 12 cu. yd. per hour, and with the engine on the frame under the cylinder everything is moved at once. Should any accident happen to the power the work can be continued uninterrupted by hand labor. For sidewalk requirements the mixer can be moved along lengthwise of a trench and the material shoveled into it from the side

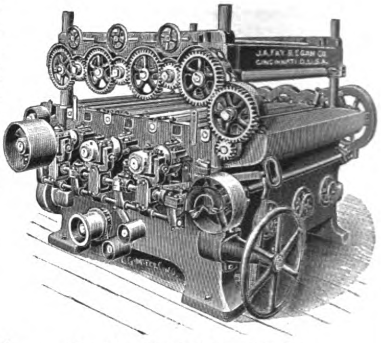
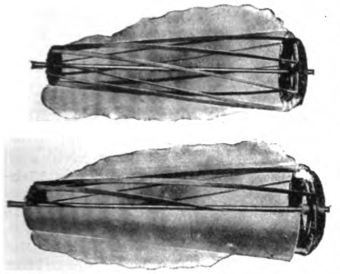


Fig. 10.—Triple Drum Sander.

Coltrin Concrete Mixer with Side Feed.—Fig. 11.—General View of the Machine.

bank. It can be loaded into an express wagon and carried about the city on small jobs, or it can be hooked on to the rear end of a wagon and



Novelties. — Fig. 12.—Position of Mixing Blades in Shell, the Head End Being at the Left and Discharge End at the Right.

taken along behind on its own wheels.

The Crescent Panel Band Saw.

A machine which is referred to as something of a departure in band saw construction has just been placed upon the market by the Crescent Machine Company, Leetonia, Ohio, and is illustrated in general view in Fig. 13 of the cuts. It is known as the Crescent Panel Band Saw, and its purpose is to saw out the inside curves of oval or irregular shaped mirror frames, picture frames, panels, &c. It is adapted for work in a general cabinet shop and in the pattern shop for sawing out inside curves of glued-up rims and other inside work which cannot conveniently be done on a regular band saw. It will also answer for common sawing where a large range is not required under the arm. The machine has a hollow frame, and is referred to as being constructed in a thoroughly first-class manner. The size of the wood table is 36 x 36 in. The wheels are 10 in. in diameter, and the size of the tight and loose pulleys are 2 x 5 in., which should make 700 to 800 rev. per min. An attractive catalogue of 36 pages, which the company has just issued from the press, illustrates and describes the leading machines manufactured, presenting in connection therewith prices, code words, &c. A copy will be mailed by the company to any one sufficiently interested in goods of this nature to apply for it.

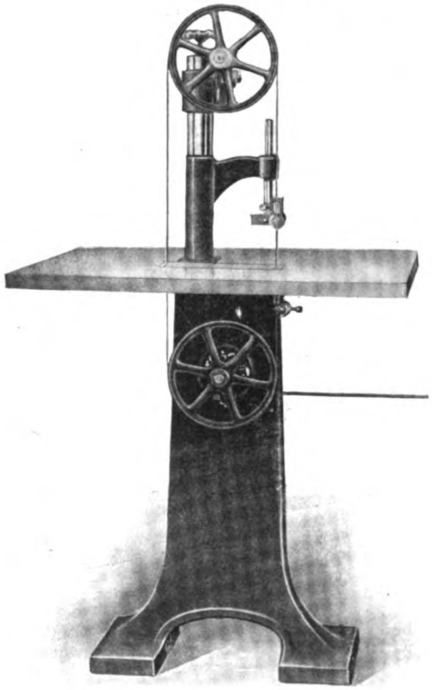


Fig. 13.—The Crescent Panel Band Saw.

Fox's Gauge Square.

Wiebusch & Hilger, Limited, 9-15 Murray street, New York, sole agents for the Challenge Cutlery Corporation, Bridgeport, Conn., have just brought out Fox's all steel patern try square, with Wiatt's patent gauge edge on the inner surface of the blade, as illustrated in Fig. 14. The square is pressed from sheet steel, polished and nickel plated, and is made by special machinery intended to give absolute accuracy. When used as a gauge the point of a pencil or scratch awl is inserted in the indentation, giving the width to be measured. The square is then drawn along the material, using its head as a guide, the pencil or awl being guided by the indentation in marking the measured line. The points of the indentations forming the gauge are at regular distances under the ¼-in. divisions. The tool can be used both as a try square and as a carpenter's gauge and thus takes the place of two tools. The indentations do not in any way prevent the inner edge of the blade being used for a try square when the gauge feature is not wanted. The tool will be made at first only with blades 6 in. in length.

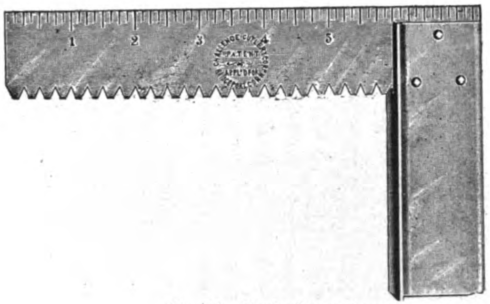


Fig. 14.—Fox's Gauge Square.

An Improved Steel Square.

An improved construction of the well-known carpenters' framing square and having detachable members which adapt it for being "knocked down" when not in use, thus rendering it easy to pack in the mechanic's tool box, is being drawn to the attention of the trade by Rankin & Scroggins, 28 to 32 Tenth street, Wheeling, W. Va., and is illustrated in outline in Fig. 00 of the actrated in outline in Fig. 15 of the accompanying cuts. The device is referred to as very simple of construction, and convenient and durable in operation. It can be used for any purpose for which the ordinary carpenter's square can be employed, and is of the same size. The point is made that it is without the disadvantage of the ordinary folding squares on the market, as it will lay perfectly flat on either side, having no projections whatever. The square has different scales on one side, namely, ¼ in., ½ in., ¾ in., 1½ in. and 3 in. to the foot, thereby making it convenient for use in laying out

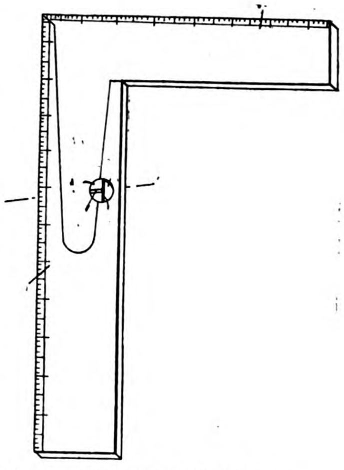
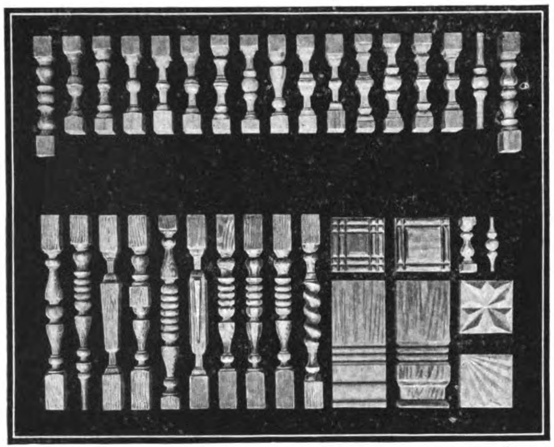


Fig. 15.—An Improved Steel Square. Square.

details, for by taking the square apart the mechanic has a 24-in. straight edge, with the scales arranged in convenient manner for work. The square is fully covered by United States and Canadian patents.

Improved Block and Baluster Machine.

Many of our readers are likely to be interested in a machine for making novelties of wood which is being introduced to the trade by the Wood Turning Machine Company, Beloit, Wis. It is known as the Mattison Block and baluster machine, having a frame cast in one piece and an iron table made in two parts, so as to avoid lifting the whole table with its round turning attachment and slides when it is necessary to get to the cutter heads. The statement is made that the machine will allow a turning of 16½ in. long in one operation or 33 in. by reversing the stock. It will admit of any number of cuts being made on square or octagon work and of any length and thickness of material. The round turning attachment with which the machine is provided consists of a slotted iron gauge 4 x 8 in. long and has adjustable head and tail stocks, also a self-centering device for stock of any size up to 3 in. The cutter head is slotted on four sides, and in these slots are held forged steel blocks for carrying the knives. The claim is made that any of these blocks or knife carriers may be removed for the purpose of grinding the knives without disturbing or removing any of the others, even though there be several carriers in the same slot. This is referred to as a new feature and one that is a great time saver. The knives are fastened to these carriers in such a way as to make a draw shear cut. The machine is equipped with an adjustable cutoff, miter and ripping gauge, round turning attachment, setting up arbor, saw collars, wrenches and countershafts. The tight and loose pulleys are 4 x 8 in. and should make 950 rev. per min. Some samples of the work produced by this machine are shown in Fig. 16 of the cuts.



Novelties.—Fig. 16.—Samples of Work Produced by the Mattison Block and Baluster Machine.

Carlin Gasoline Hoisting Engine.

A small, light, compact and durable hoisting engine of recent design, particularly intended for bricklayers in the erection of three and four story buildings, is shown in Fig. 17 of the illustrations. Ease of handling and economic operation are the principal claims made for this outfit by the manufacturers, the Carlin Machinery & Supply Company, Allegheny, Pa. One machine of this type is operating on a four-story building with a cage handling two barrows, each containing 40 bricks. The friction drum is of the standard type, with wood cone friction drum 9 in. in diameter, 12 in. long, which can be lagged to further increase the diameter to 14 in. A steel cut gear pinion on the crank shaft of the engine engages with a cut gear of larger diameter on the drum shaft. These gears are so proportioned that the double gearing found on so many machines of this class is not necessary, thereby simplifying and lessening the number of parts and wear. Gear guards protect the gears from becoming clogged with dirt and other foreign matter. A pedal operated steel band brake, with segmental wood lining, is provided for lowering the load. When it is desired to hold the load suspended a pawl engages with a shrouded tooth ratchet wheel bolted to the drum. The whole machine is mounted on a neat cast iron base, with levers conveniently placed for the operator. The 5-hp. gasoline engine used for operating the hoist is especially adapted for its service. It is a horizontal four-cycle engine, built with a view to compactness, simplicity and accessibility of all parts. In this type of engine there is claimed to be less vibration than is found in the vertical type and being longer connected it is said to be more durable. A small feed pump attached to the engine delivers the gasoline into a glass cup at the mixing valve, which thus serves as a sight indicator. This mixing valve supplies the explosive vapor in amounts proportional to the work done, the surplus gasoline returning to the tank through an overflow. The gasoline is entirely inclosed, eliminating all danger from explosion. The cast iron cylinder water jacket is removable, making it easy of repair in case of freezing through neglect. A pendulum governor controls the speed, which can be regulated while the engine is running. The engine has a lifting capacity of 1000 lb. on a single line. Gas attachments can be substituted for the gasoline when so desired. One machine, it is stated, is operating with natural gas, at a cost of 25 cents per day of eight hours. The operator was formerly a hod carrier.

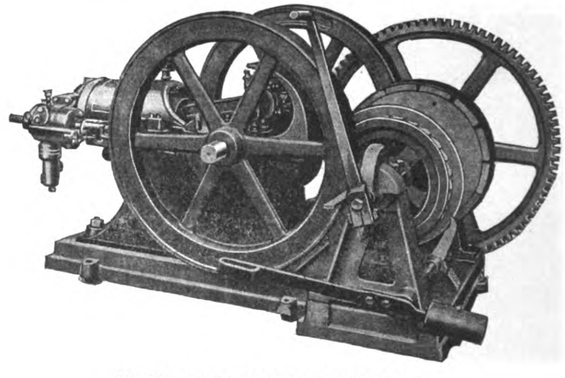
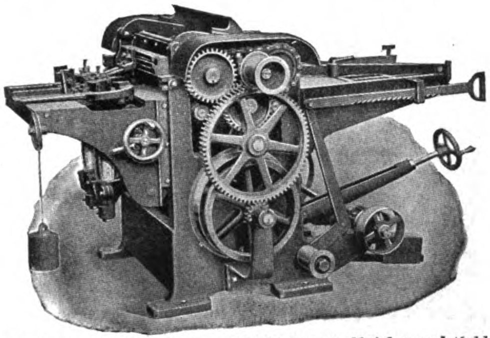


Fig. 17.—Carlin Gasoline Hoisting Engine.

A Medium Weight Planer, Matcher and Molder.

Those in the wood-working industry requiring a medium size planer, matcher and molder are likely to be interested in the machine which we illustrate in Fig. 18 of the engravings, and which is being placed on the market by the Cordesman-Rechtin Company, Butler street, Cincinnati, Ohio. The capacity of the machine is said to be such that it will plane top, side and two edges of such work as flooring, ceiling, wainscoting, partition, casing, siding and a multitude of other moldings in a single operation. The frame is thoroughly ribbed throughout, and the metal is distributed in a way to insure the maximum of strength and rigidity. The table, which is fully 14 in. deep, is made in one piece, and its top plate in the rough is over 1 in. thick, with bracer arches on the under side reducing vibration to a minimum. It is fitted to the frame by "Cordesman's Patent Process," by which "the table is locked to the frame as securely as though both were cast in one piece." The table may be adjusted while the operator is in working position, a rule in plain view telling the space under the cutter head. The feed works consist of four power driven feed rolls, all 4 in. in diameter, two rates of speed being provided. The new chain and gear drive is referred to as being very powerful and as eliminating many gears and studs. The infeeding roll is fluted and is given pressure by weight levers, while the outfeeding roll has spring tension controlled by hand wheels. The matcher spindles are made of steel, and revolve in long split boxes lined with babbitt metal.

Both upper and lower spindle boxes are connected by webs and gibbed to two horizontal bearings securely fastened to the table. Owing to the peculiar construction of these parts the claim is made that belt strain does not affect the cap side of the boxes, and provision is made for taking up all wear. The matcher spindles with heads move up and down with the table. They have a lateral adjustment for the different widths of boards, and are provided with patent chip breaking device to prevent slivering and breaking out of knotty and cross-grained lumber. The machine possesses many other valuable features peculiar to the planer, matcher and molders turned out by this concern, among them being the arrangement of matcher weighted clip, guides and enlarged pocket around the side heads, all of which are necessary for the successful manufacture of sprung or crown molds and similar work requiring large projecting cutters used in making bevel side cuts and deep molded edges. The machine will plane up to 26 in. wide, and from 1/16 in. up to 8 in. thick. It matches up to 14 in. wide, and from ⅜ in. up to 2 in. thick. The tight and loose pulleys are 12 in. in diameter, with a 6½ in. face, and the countershaft makes 1050 revolutions per minute.



*Novelties.—Fig. 18.—Medium Weight Planer, **Matcher and** Molder.*

TRADE NOTES.

S. C. JOHNSON & SON, Racine, Wis., state in their page advertisement this month that they will send free to any one furnishing his name and address the interesting little work entitled "The Proper Treatment of Floors, Woodwork and Furniture." It consists of 48 pages, is 5 x 8½ in. in size and is illustrated from life and printed in six colors. The regular price is 25 cents, but for a limited time the company will send it free as stated. In this connection the manufacturers refer to Johnson's Prepared Wax for floors, woodwork and furniture and to Johnson's Polishing Mitt, which is their latest device for polishing furniture and woodwork with their wax.

THOSE of our readers who are contemplating a course in draftsmanship will doubtless be interested in the announcement made in our advertising pages this month by Chief Draftsman, Division 3, Engineers' Equipment Company, Chicago, Ill. It is stated that a first-class drafting room knowledge is taught in a few months' home study, the instructor being the chief draftsman of a large concern. The announcement is accompanied by a portrait of the instructor.

WE have received from the Lehon Company, West Forty-third street, Chicago, Ill., one, two and three-ply samples of "Roofrite," a composition roof covering for which the company makes strong claims. The material is made 36 in. wide, and a roll contains 216 sq. ft. which, it is pointed out, will lay two squares. The one-ply weighs 35 lb. per square; the two-ply weighs 45 lb. per square, and the three-ply weighs 55 lb. Reference is made to the rubbery toughness of the coating which, it is pointed out, "insures a wearing surface that sheds water longer, better and at a lower ratio of cost per year than other competitive material."

THE AMERICAN SCHOOL OF CORRESPONDENCE, 3112 and 3113 Armour avenue, Chicago, Ill., presents in its page advertisement this month an announcement relative to an unusual opportunity for carpenters, builders, draftsmen, architects or mechanics. The statement is made that without leaving his own home or losing a minute from his regular work one can make himself complete master of his own trade and without costing him one cent to try. It is announced that on December 31 of the present year there will be ready for delivery a work entitled "Cyclopedia of Architecture, Carpentry and Building." It will consist of five volumes of 2500 pages and 1500 illustrations, consisting of full page plates, details, sections, &c., also tables and valuable formulæ. In the announcement of the school elsewhere in this issue full particulars are given relative to the terms under which this work can be obtained, also a brief table of contents.

THE GRAMMES CIRCULAR SAW VISE is the subject of an announcement in another part of this issue by L. F. Grammes & Sons, 1247 Hall street, Allentown, Pa. Attention is called to the fact that this is a swivel vise, swings three-quarters of a circle and gives the only accurate position for filing any circular saw or cutter. It is constructed entirely of iron; is referred to as unbreakable and nonvibrating, and gives the filer perfect control. What the manufacturers have to say concerning the cost of the vise, the conditions under which a month's trial can be secured free, and commissions paid for selling, is likely to interest many of our readers.

THE SACKETT PLASTER BOARD COMPANY of New York City has just been incorporated with a capital of $500,000. Among the directors are Edward H. Wardell, South Orange, N. J.; Augustine Sackett, New York; Frederick L. Kane, Huntington, L. I.

THE GOODELL MITER BOX is the basis of an announcement in another part of this issue by the Goodell Mfg. Company, Greenfield, Mass. The device is made entirely of steel, has corrugated backs and graduated gauge for duplex cuts, automatic stops for holding up the saw, and many other features likely to interest the building mechanic. A circular concerning the miter box can be obtained free on application to the company.

THE CONCRETE BLOCK & CONSTRUCTION COMPANY is the name of a concern just organized at Bridgeport, Conn., with a capital stock of $10,000, for the purpose of carrying on a general contracting business. The incorporators are William B. Pendleton and Harold C. and Stanley H. Bullard.

THIS is the season of the year when the attention of builders and especially of house owners is directed to the question of heating, and they will doubtless be interested in the announcement presented in our advertising columns this month by the Schafer Furnace Company, Box Q, Youngstown, Ohio. The statement is made that a Schafer furnace, which is made of wrought iron riveted, has a firebox formed of 3-in. material, and which will last a lifetime. The furnace is offered at a price so low as to command the attention of all in need of a heating apparatus, and the company issues a booklet, free, showing how any one can set up the furnace for doing its work.

THE SANDUSKY PORTLAND CEMENT COMPANY, Sandusky, Ohio, advises us that it has furnished the Orford Copper Company, at Bayonne, N. J., with the material for waterproofing 200,000 sq. ft. of cement roofing. The engineers in charge of the work are Curtin Ruggles Company, New York City.

MORE OR LESS ATTENTION has recently been given in these columns to the question of shingling and the tools by means of which rapid work can be done. In this connection it is interesting to note the announcement in our advertising pages this month by the Coldwater Specialty Mfg. Company, Coldwater, Mich., which calls attention to Stowe's shingling kit for carpenters and builders. The outfit consists of antislipping sandals, roofing saddle and shingle holder, and the claim is made that although no scaffolding is required there is no danger of the mechanic slipping and falling. The illustrations which are presented in the company's advertising space clearly indicate the appearance of the outfit.

THE UNITED CEMENT MACHINERY MFG. COMPANY has been organized under the laws of Maine with an authorized capital stock of $1,000,000, and will operate under the patents of the Harmon S. Palmer Company, Washington, D. C.; the Winget Concrete Machine Company, Columbus, Ohio, and the Cement Machinery Mfg. Company, Burlington, Iowa. The headquarters of the company will be at Columbus, and the manufacturing plant will be located at Plain City, Ohio, about 18 miles from Columbus. The company will manufacture the machines now built by the three companies named above, and will also handle a full line of machinery for manufacturing cement blocks. The officers are: President, Harmon S. Palmer; first vice-president and treasurer, J. F. Angell; second vice-president and manager, J. W. Sanderson; secretary, J. M. McDowell, and general counsel, H. C. Black.

Carpentry and Building
WITH WHICH IS INCORPORATED
The Builders' Exchange

PUBLISHED MONTHLY

To all parts United States, British America and Mexico, - $1.00 Per Year
To all other Countries, - - - - - - - - 1.25 Per Year
Advertising Rates on Application.

BUSINESS OFFICES.

NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHERS........14-16 Park Place.
PHILADELPHIA—S. S. RECKEFUS, Manager..Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—WALTER C. ENGLISH, Manager........Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, Manager........Park Building, 357 Fifth Avenue.
CHICAGO—A. A. AINSWORTH, Manager........Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—HENRY SMITH, Manager........Pickering Building, Fifth and Main Streets.
CLEVELAND—EZRA S. ADAMS, Manager........The Cuyahoga, 311 Superior Stre

ENTERED AT THE POST OFFICE, NEW YORK, AS SECOND-CLASS MATTER.

Here Mr. Carpenter This 25-cent Book Is FREE

It tells all about finishing, refinishing and polishing wood. Full of practical ideas of great value to carpenters and wood finishers.

Write For It

Send us your name and address to-day for our new book **"The Proper Treatment for Floors, Woodwork and Furniture."** It is illustrated from life and printed in six colors—size 5 x 8½ inches—48 pages. It is the most elaborate and practical book of its kind ever printed. The regular price is 25 cts., but for a limited time we will send it free as above.

Johnson's Prepared Wax

"A Complete Finish and Polish for All Wood"

For Floors, Woodwork and Furniture

It produces a lasting and artistic finish, to which dust and dirt will not adhere. It does not crack, blister, peel off or show laps. Heel marks and scratches will not show.

Johnson's Polishing Mitt is our latest device for polishing furniture and woodwork with our wax. Made of sheepskin with wool on, is open across the back and slips on hand. It is far ahead of cloth, brushes or anything for similar use, and will last for years. Sent FREE for name of your paint dealer. Use coupon below.

Johnson's Prepared Wax is sold by all dealers in paint—Universal size, 1½ oz., 10c.; Household size, 4 oz., 25c.; 1 and 2 lb. cans, 60c. per lb.; 4, 5 and 8 lb. cans, 50c. per lb. If your dealer will not supply you, send to us. Mail coupon to-day for book and mitt. Don't delay.

S. C. Johnson & Son, Racine, Wis.

"The Wood-Finishing Authorities"

Coupon CBII
S. C. Johnson & Son, Racine, Wis.

Gentlemen: My paint dealer's name is ----------------------

His address is ----------------------
----
for which please send me FREE prepaid one Johnson Polishing Mitt and copy of your new book, "The Proper Treatment for Floors, Woodwork and Furniture," as per your offer.

My name is ----------------------

Address ----------------------

We Want Every Carpenter and Builder to Try Our Columns

If Your Dealer Can't Supply You, Write Us.

CATALOG AND SAMPLE SECTION FREE

OUR GUARANTEE

Our columns are absolutely perfect in architectural proportion, mechanical construction and material. They will not open at the joints, check or wrap. They are sold with the distinct understanding that if not satisfactory in every way they are returnable at our expense. You take no risk whatever.

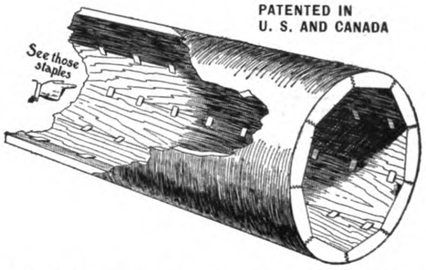
THE PRICE?

NO MORE THAN YOU PAY FOR THE CHEAP GLUED UP KIND

5000 ASSORTED SIZES IN STOCK ALL THE TIME.

ORDERS FILLED SAME DAY RECEIVED. NO DELAYS.

PATENTED IN
U. S. AND CANADA

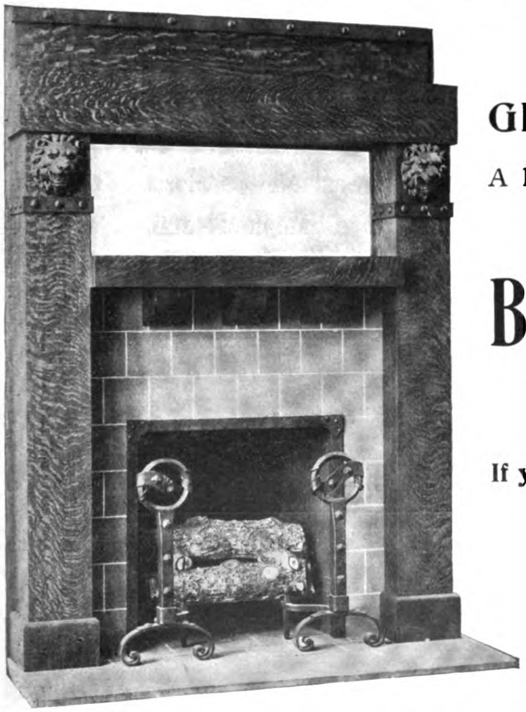


Made Only By

American Column Co.,
Battle Creek, Mich.

Don't Take Substitutes

You Don't Have to—Insist On The Staple-Locked.



WHY NOT

GIVE YOUR CUSTOMER

A little greater satisfaction and at the same time save yourself a few dollars by ordering a

BURRITT MANTEL

They please others—we're sure they'll please you

If you need FIRE PLACE GOODS, send for Catalogue "C"

COAL GAS GRATES AND IRON FENDERS

In fact everything required for that fire place.

TILES AND TILE WORK OF EVERY DESCRIPTION

If we can save you money, you want to know it, don't you?

THE A. W. BURRITT CO.
"THE MANTEL FOLKS."

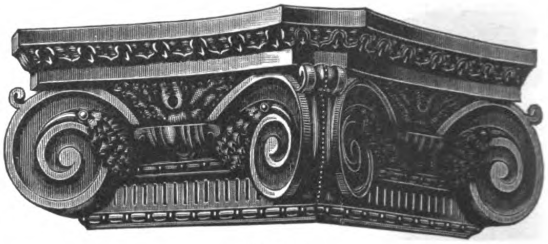
400 KNOWLTON STREET,
BRIDGEPORT, CONN.

Wood Carvings

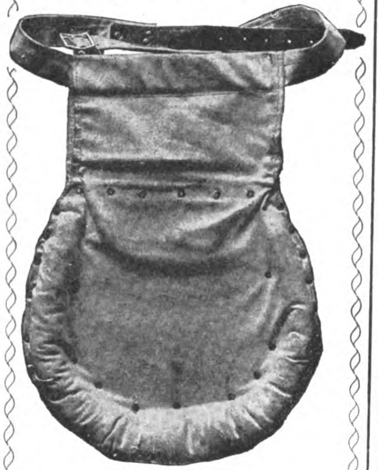
Hand and Machine Carvings, Mouldings; Festoons, Newel Posts, Head Blocks, Rope and Twist Balusters and Ornaments. We also make a specialty of Fine Staved Up Quartered Oak and Birch Columns for Interior Work.

Almost 1,500 designs illustrated in our New Catalogue and Price-List No. 20. Mailed for 15c. in stamps.

Waddell Mfg. Co.,
Corner Taylor and Coldbrook Sts.,
GRAND RAPIDS, MICH., U. S. A.



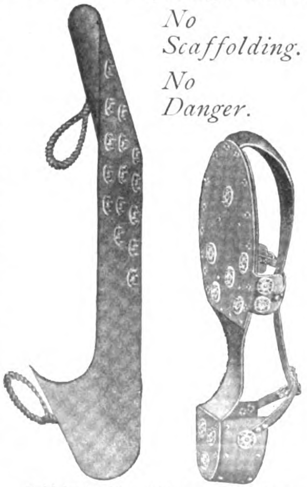
No. 0575.



STOWE'S
Shingling Kit
For Carpenters and Builders.

ANTI-SLIPPING { Sandals, Roofing Saddle, Shingle Holder

No Scaffolding.
No Danger.

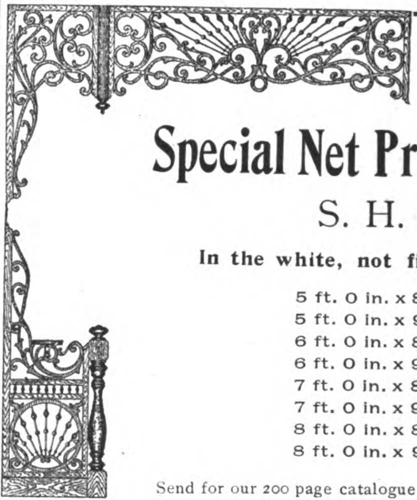


Sold by leading jobbers and hardware dealers. If your dealer will not supply you with them send direct to us with money order and we will send them to you prepaid.

Coldwater Specialty Mfg. Co.
COLDWATER, MICH.

Easy Lessons in Roof Measurements. Twelve Short Lessons on Figuring from Architects' Drawings the Amount of Material Required to Cover a Given Surface in Flat, Hipped or Irregular Shaped Roofs. 31 pages, 12 illustrations .... .35

For sale by David Williams Co., 14-16 Park Place, N.Y.



Special Net Prices on Grilles

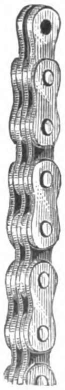
S. H. 1072½

In the white, not filled and varnished.

5 ft. 0 in. x 8 in.,	$9.60
5 ft. 0 in. x 9 in.,	10.00
6 ft. 0 in. x 8 in.,	10.80
6 ft. 0 in. x 9 in.,	11.25
7 ft. 0 in. x 8 in.,	12.00
7 ft. 0 in. x 9 in.,	12.75
8 ft. 0 in. x 8 in.,	13.20
8 ft. 0 in. x 9 in.,	13.75

Send for our 200 page catalogue showing a large assortment of millwork for prompt delivery.

Schaller-Hoerr Company
416-426 Blue Island Ave., Chicago, Ill.



THOMAS MORTON,
169 Elm Street, New York.

Copper Cable, Champion Metal,
Steel Cable, Steel Champion,

SASH CHAINS.

CHAINS

For Suspending Heavy Doors, Gates, etc.
All of SUPERIOR QUALITY.

Miller's Hand Mortiser

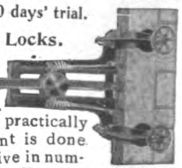
PRICE $12.00. $4.00 with order, balance after 30 days' trial.

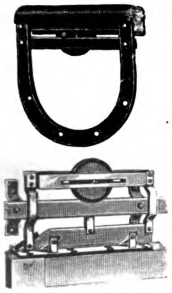
Its Work is to Make Openings in Doors for Mortise Locks.

The time is Three Minutes. The Material is Hard, Soft, Cross Grained and End Wood.

The job is Clean, True and Parallel with Sides of Door. The Labor is Performed with slight exertion. The care is practically none, as the tool does not get out of order. The adjustment is done in a moment's time for the different sizes. The cutters are five in number, and cover locks from 1-2 to 1 1-8 inches thick. Thin Doors are handled as easily as Thick Doors.

Riverside, Cal. ILLER MFG. CO. Cincinnati, O.





Lane Barn Door Hangers

Give best satisfaction. We are the originators and largest makers of U-shape hangers.

"LANE'S STANDARD"

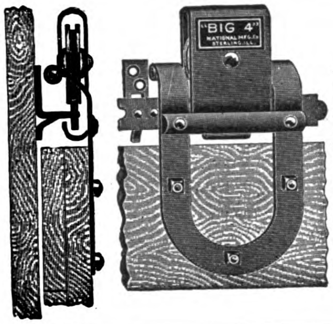
is the original steel single rail . . PARLOR DOOR HANGER

The most popular hanger to-day—because it is *all* steel and substantially and well built on correct mechanical principles.

—IT GIVES SATISFACTION.—

Sold by Hardware Trade. Send for circulars to

LANE BROTHERS CO.,
423-455 Prospect St., - - - POUGHKEEPSIE, N. Y.



"BIG 4" FLEXIBLE DOOR HANGER.

Anti-Friction. Cannot Jump the Track.
Exclusive Sale Given.

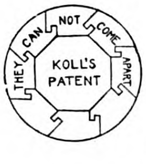
NATIONAL MFG. CO.,
STERLING, ILL.

Grand Rapids Wood Carving Co.,

GRAND RAPIDS, MICH.

Catalogue on application.

6—26 in. diam.—
24 ft.-0 in. long.
8—24 in. diam.—
22 ft.-0 in. long.
79—14 in. diam.—
11 ft.-7 in. long.



SHINNECOSSETT INN, NEW LONDON, CONN
R. W. Gibson, Architect.

Koll's Patent Lock Joint Columns and Ornamental Capitals were made and furnished by us for this building.

We have unusual facilities for turning out work of this character. See our special catalogue in "Sweet's Indexed catalogue of Building Construction" pages 323 to 328.

HARTMANN BROS. MFG. CO., Mt. Vernon, N.Y., U.S.A.

New York Office. 1123 B'way.—Also Henry Sanders Co., cor. Elston & Webster Aves., Chicago, Ill. A. J. Koll Planing Mill Co., Los Angeles, Cal.

SEND FOR CATALOG (D.)

GRILLES "Direct from Factory" MANTELS

No. 225—48x12 inches, **$3.60.** Retail value, $7.00.
No. 230—48x14 inches, with Curtain Pole, **$4.50.** Retail value, $9.00.
Others from $2.50 up. Largest assortment. Division Screens and special Grilles to order.

Tile and Mosaics
for everywhere.
Walls, Floors, etc.

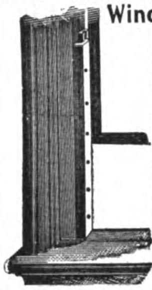
$13.25 buys this solid oak Mantel, 80 in. high, 54 or 60 inches wide, 28 x 16 Mirror. Heavy columns and elaborate capitals. Tile facing and hearth with Plated Frame and Club House Grate, $10. extra.

HARDWOOD FLOORS

will last as long as the house. Any carpenter can lay it easier than ordinary flooring. Get our prices.

Write for catalog of Mantels, Grates, Tiles for floors and baths, Slate Laundry Tubs, Grilles, etc. It is free. Or send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from **$12 to $200.**

W. H. OSTENDORF, - - - - - **2923 N. Broad St., Philadelphia, Pa**



King's Automatic Weather Strip.
Window and Door Stop.

The only perfectly satisfactory weather strip, window and door stop on the market.

Keeps out cold and dust.

Makes a perfectly tight joint.

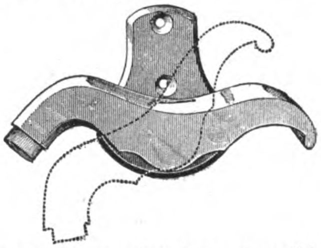
Windows can be raised and lowered to desired position without the use of fasteners or of weights.

Do not build a house until you have investigated the merits of these strips.

Write for prices.

MANUFACTURED BY
The King Manufacturing Co.
Newton, Ia.

EMPIRE DOOR HOLDER IMPROVED



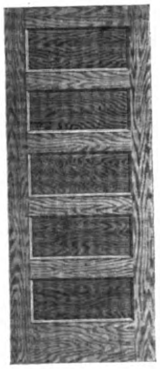
Holds the heaviest doors on polished floors. 50% greater pressure than any other. Easy to put on, easy to use; the toe operates it. Write for circulars to

CALDWELL MFG. CO.,
5 Jones Street, Rochester, N. Y.

50% SAVED

OAK VENEERED DOORS IN STOCK ALL SIZES.

$ $
$ $
$ $
$ $
$ $
$ $
$ $



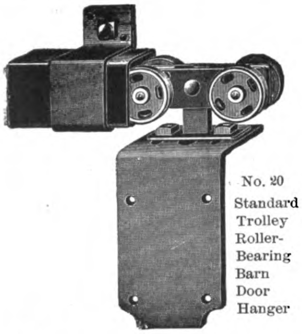
MADE IN STOCK QUANTITIES, SOLD AT STOCK PRICES, CARRIED IN STOCK

THE FOSTER-MUNGER CO.
AMERICAS GREATEST SASH & DOOR HOUSE
CHICAGO, U·S·A·
WRITE FOR VENEERED DOOR BOOK 1448 A

Forest City Bit & Tool Co., Rockford, Ill., U.S.A

Manufacturers of Wood Boring Bits, Hollow Mortising Chisels, Common Mortising Chisels and Tools
Send for CATALOG "G" Send for

—Its Disadvantage.—Shrinking modesty is an attractive trait of character, but it seldom gets a raise of salary.—*Somerville Journal.*

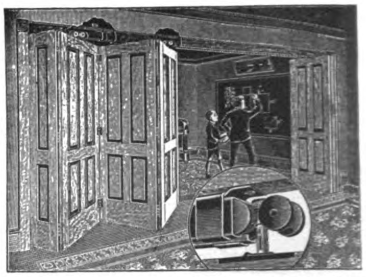


RICHARDS
DOOR HANGERS
are the best.

Made for sliding doors of all sizes and weights.

Popular with architects and builders.

Sold by dealers.

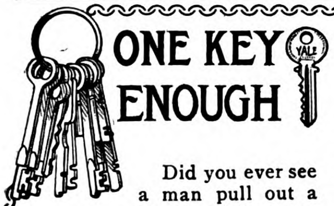


No. 135 Ball-Bearing Swivel Door **Hanger** for folding doors. Vertical Adjustment.

The Richards Mfg. Co., Aurora, Ill.

New York Office, 101 Reade St.;

Send for Catalogue of Door Hangers, Fire Door Fixtures, Conveying Systems.



ONE KEY ENOUGH

Did you ever see a man pull out a bunch of keys as big as your fist and try a half dozen which looked alike before he found the proper key? A Yale Master-key Locking System makes one little key open a dozen or a thousand locks of many sizes and uses. The business man may carry one key that will pass every lock in his residence, stable, factory, office, and country place. His wife will have a sub-master key that will open every lock in the home; the superintendent, one that will open any lock in the factory, etc., while each lock has its individual key which will unlock it and no other.

THE YALE DUPLEX Master-Key System

gives all this convenience without reducing the number of key changes and thus lessening the security.

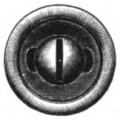
Residences so equipped amply repay in satisfaction the slight additional cost. For factory buildings and public institutions, such as city buildings, school houses, and charitable institutions, the actual savings effected in time, money, tools and supplies is sufficient to return in a very short time the cost of the master-key locking system.

Write for folders explaining the Yale Master-key Locking System, and "The Key to a Good Thing," which shows how a Yale Lock Works.

THE YALE & TOWNE MFG.CO.
9-15 MURRAY STREET,
NEW YORK

THE IVES' PATENT WINDOW STOP ADJUSTER

PATENTED



FOR WINDOWS AND SLIDING DOORS

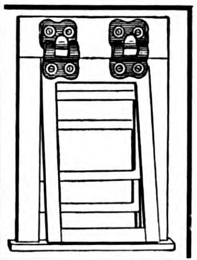
Insures Protection against Cold Draughts, Dust, Rattling or Binding.

The only Window Stop Adjuster made from one piece of metal that has a heavy bed that will not bend or cup in tightening the screw.

THE H. B. IVES CO.

40 Page Catalog mailed free. **New Haven, Conn., U. S. A.**

YOU CAN MAKE AND SELL MORE



STORM WINDOWS

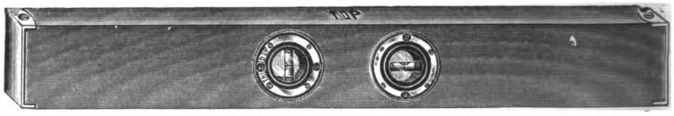
if you hang them with

GOSSETT DETACHABLE SUSPENSION HINGES

Your customers will be better pleased. Storm sash so attached can be opened for ventilation. Put up, taken down or replaced with screens without the use of ladder or tools. Sample pair free if you mention this paper. Sold by dealers in Hardware and Building Material.

F. D. KEES MFG. CO., Beatrice, Nebr.

COOK'S LEVEL



For Carpenters, Machinists, Masons.

MADE OF WOOD, IRON, ALUMINUM.

Of all Dealers, or Catalogue on Request.

EVERY LEVEL WARRANTED. **DAVIS & COOK, Watertown, N. Y.**

THE NEW YORK STEEL CORNER PLATE CO.

—SUPPLY—

The Parker Steel Corner Bead for the Protection of Plastered Corners

Outlines a perfect corner. The best Corner Bead in the market. Fits any ground.

Endorsed by Leading Architects, Builders and Plasterers.

Telephone
876 Madison Square.

All communications
to 1135 B'way, N. Y. C.

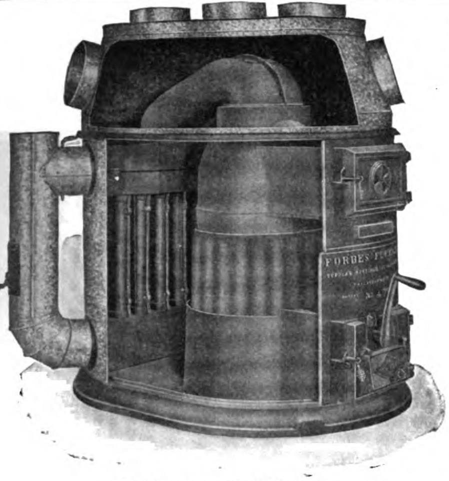
All phases of Plumbing, Drainage and Water Supply are expertly treated in the new book

Plumbing and House Drainage Problems.

THE SIXTH EDITION REVISED AND ENLARGED.

309 Pages, 197 Illustrations. TWO DOLLARS, PREPAID.

DAVID WILLIAMS COMPANY **14-16 Park Place, New York.**



Height over all, 4 ft. 3 in.

THE FORBES FURNACE

Burns Either Hard or Soft Coal

EVERY ONE GUARANTEED
IF PROPERLY INSTALLED

No Sheet Iron Drums—Entirely Cast Iron
—Radiating Drums 1-8 Inch Thick,
Will Wear for Years

YOU RUN NO RISK IN PUTTING IN THE FORBES FURNACE

SEND FOR CATALOG AND FULL PARTICULARS

Tubular Heating & Ventilating Co.
228 Quarry St., Philadelphia

Honest Value!

Nothing Light Weight or Frail about the

Bengal Furnace

It's heavy—but well proportioned, and the weight placed where it will give big heating capacity and great durability.

When properly installed you can depend on plenty of pure warm air,—and small coal bills.

Burns hard or soft coal.

If you are looking for an honest Furnace—one you can depend upon—ask for our proposition.

DO IT NOW!

THE FLOYD WELLS CO., Manufacturers, Royersford, Pa.

The Carpenter and Builder who *insists* that the local dealer furnish heating apparatus marked "made by the

INTERNATIONAL HEATER CO.,"

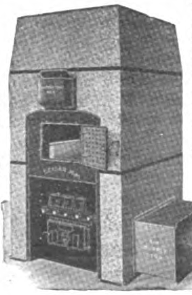
will never be in hot water himself. This "F" series HOT WATER HEATER invariably gives satisfaction.

UTICA, N. Y.
New York. Boston. Chicago.

$49
LEADER
Steel Furnace

THIS No. 45 Leader Steel Furnace will heat uniformly a 7 or 8 room house, a good sized store, a school, or small church. It is durable, strong, compact. Has steel body with galvanized iron casing. Works easily with coke, hard or soft coal or wood. Has brick fire box. It costs $49, freight paid, east of Omaha. We furnish also plans of your house so you yourself can set up the furnace with its pipes, registers, smoke pipe, etc. Hundreds of people have done it—you can. Write for our new illustrated instruction book on furnaces, "Modern Furnace Heating." It's free. It's valuable. Do it now.

HESS WARMING &
VENTILATING CO.,
709 Tacoma Building,
CHICAGO, - ILLINOIS



$39 UP for the famous Schafer Furnace Wrot Iron (not steel) Riveted. 3-inch thick *lifetime* fire box. Shipped for only $15 down and no profit to *Us* until *You* are satisfied. Book showing how anyone can set it up, free. SCHAFER FURNACE CO., Box Q, Youngstown, O.

any SAW teeth

The GRAMMES CIRCULAR SAW VISE—is a swivel vise—swings three-fourths of a circle—gives the one and only accurate position for filing any circular saw or cutter

All iron—unbreakable—non-vibrating—gives the filer perfect control—and it cannot possibly injure the saw or cut at the wrong angle.

THE GRAMMES
CIRCULAR SAW VISE

Saves time because of its convenient adaptability to any and every shop need for a saw sharpening vise

A free months trial for to test it out—you can save enough in that time to pay the $6.50 it costs.

If you file at all—here's the only vise your men will use after they try it once.

WHO WANTS TO SEE ONE?

L. F. GRAMMES & SONS
1247 Hall St., Allentown, Pa.

Liberal commission paid for selling these vises.

IF you are at all interested in the question of good plumbing, get the new book

Plumbing and House Drainage Problems

The Sixth Edition, Revised and Enlarged.

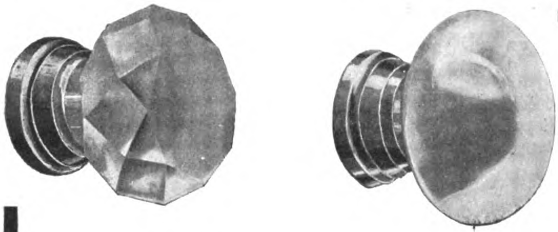
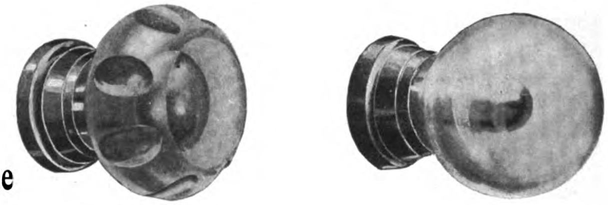
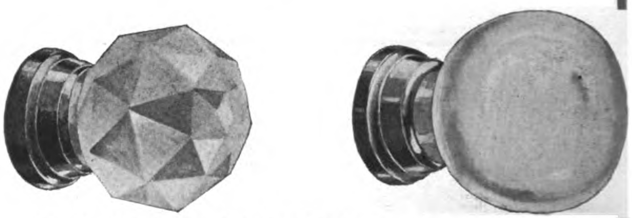
All phases of Plumbing, Drainage and Water Supply are expertly treated.

309 pages, 197 illustrations.

TWO DOLLARS, PREPAID.

DAVID WILLIAMS COMPANY,
14-16 Park Place, New York

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

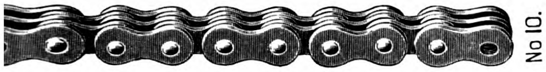


CHAMPION


PAT. SEP. 22. 74. FEB. 23. 86.

SASH CHAIN

CABLE CHAIN



JACK CHAIN

The SMITH & EGGE MFG. CO.

Bridgeport, Conn.

Manufacturers of "**Giant Metal**" **Sash Chains**
" " "**Red Metal**" " "

Cable Chains, Jack Chain, Bell Hangers' Chains
and Plumbers' Chains
Made in Brass, Copper and Steel

WRITE FOR CATALOGUES AND PRICES

We are the ORIGINATORS of SASH CHAIN as a SUBSTITUTE for sash cord

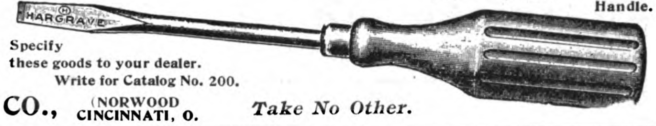
---

HARGRAVE'S TOOLS ARE BEST

QUALITY
FINISH
DESIGN

HARGRAVE
SCREW-DRIVER **Hard Wood Handle.**

The blade is made of round steel, forged with a square taper on the end which is driven firmly into the body of the handle, the strain coming directly under the hand. The point of the blade is ground transversely to prevent any slipping out of the slot of the screw. Well tempered and finished.



Specify these goods to your dealer.
Write for Catalog No. 200.

THE CINCINNATI TOOL CO., (NORWOOD CINCINNATI, O.

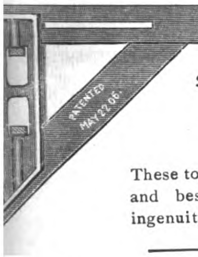
Take No Other.

THE AKRON ECLIPSE LEVELS

Manufactured by **The BAKER McMILLEN CO.**
AKRON, OHIO.

We have a proposition that will interest every carpenter. Drop us a postal and we will send it to you.

The Fox Tools

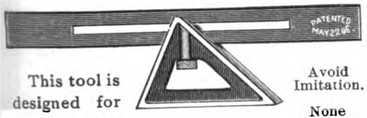


Square and Miter No. 10

Adjustment 5 to 8 in.

These tools are the latest and best that Yankee ingenuity can produce.

Octagon and Miter No. 12

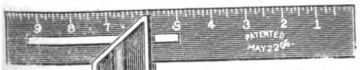


This tool is designed for marking octagons and miter sliding blade will allow of long or short cut.

Avoid Imitation.

None genuine without sliding blade.

The Gem Square and Miter No. 11



Try, miter and gauge square; adjustment 1⅛ to 8⅛ inches.

P. L. FOX
Patentee and Sole Manufacturer of
Fox's Tools
432 WILLIAM ST.
BRIDGEPORT, CONN.

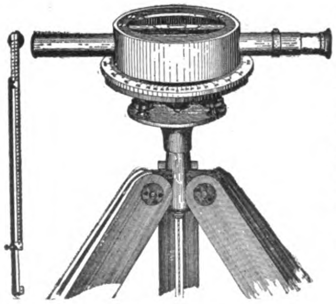
If your dealer won't furnish them write me.

OUR NEW NICHOLLS FRAMING SQUARE

No. 100-A

Has an **Octagon Framing Rule** for framing Octagon roof. It is found on the back of body of square, and on face of body of square is found our **Common Framing Rule.**

NICHOLLS MFG. CO., **Ottumwa, Iowa**



WHAT BUILDERS HAVE BEEN LOOKING FOR

BOSTROM'S

Improved Builders' Level

An absolutely reliable leveling instrument for Architects, Builders, Carpenters, and Stone Masons. Can be used for any kind of foundation work and getting angles, is simple in its construction, easily understood, and can be operated by any one. Is made of Brass, oxidized, and has a silvered circle of degrees. Has achromatic Telescope of ample power for such work. Price, including Plumb Bob, Tripod and Graduated Rod and Target, $25.00. Write for circular and be convinced. Every instrument guaranteed.

BOSTROM-BRADY M'F'G CO.,
53½ West Alabama Street,
Atlanta, Ga.

BOSTROM-BRADY MFG. CO,
ATLANTA, GA.

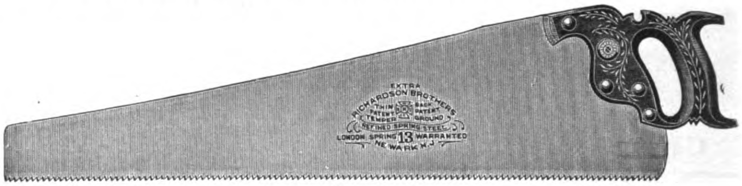
Mt. Vernon, Ind.
June 19, 1906.

Gentlemen:

Having purchased one of your Builders' Levels last January, I am pleased to say that it is all you claim for it and do heartily recommend it to the Builder and Contractor for leveling foundations and setting stone piers. I have used it on several jobs: The residence of A. J. Grobert; a couple of school buildings and on the Ice & Cold Storage job—a fair sized job—amounting to $25,000, and it proved to be all right.

Respectfully yours,
ED. STALLMAN.

OLD RELIABLE RICHARDSON SAWS.



ESTABLISHED 1860.

The peer of them all. Try one and be convinced. Every saw fully warranted.

NATIONAL SAW CO. Operating Richardson Bros. **NEWARK, N. J.**

Quality Tells

WHEN HENRY DISSTON WAS ASKED THE QUESTION: "WHAT DO YOU PUT IN YOUR SAWS?"
HE REPLIED: "GOOD STEEL AND HONEST WORK."

UPON THIS FOUNDATION IS BUILT DISSTON QUALITY.

"If you want a saw it is best to get one with a name on it that has a reputation. A man who has made a reputation for his goods knows its value as well as its cost and will maintain it"

ESTABLISHED
1840

HENRY DISSTON & SONS, Inc.
PHILADELPHIA, PA.

C. C. C. SAW CLAMP

Always ready. Easy to Adjust. Never out of order. Up to date.

Latest and Lightest.

Pat. U. S. and Canada 1906. Other Patents Pending.

Can be placed on the edge of bench timber, board or almost anywhere; takes but little room in box; weight, about 1 lb. No carpenter can afford to be without it. **PRICE, 75c.** If your dealer cannot furnish it we will mail postpaid on receipt of price.

C. W. CARDWELL MFG. CO., - - JAMAICA, N. Y.

When you buy

ECCENTRIC CLAMPS

specify

COLT'S

There is a difference—let us tell you
Ask for catalogue No. 129.

BATAVIA CLAMP CO.,
23 Center Street, BATAVIA, N. Y.

FURNACE HEATING.

By William G. Snow

With an Appendix on Furnace Fittings.

170 Pages; 90 Illustrations; Size, 6 x 9 inches.
Cloth bound. Price, $1.50.

DAVID WILLIAMS CO.
14-16 Park Place, - New York

You Can't Get Along Without Them. Don't Try.

Thousands of mechanics have written us after receiving our books that they are simply indispensable to them, and they can be obtained so easily it is foolishness for anybody to be without them.

← This book is most complete in information about wood working tools and

← this one is just as complete and indispensable to anybody who wishes to post himself or to find out where to buy metal working tools, machinery and supplies.

Gladly sent to anybody anywhere on receipt of 25 cents each.

The Chas. A. Strelinger Co.,

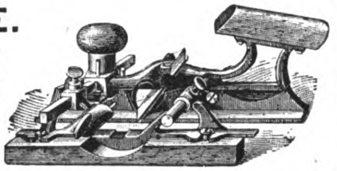
Box B. **DETROIT, MICH., U. S. A.**

FALE'S PAT. PLANE.

Constituting Carpenter Plow, Dado, Filletster, Matching Sash, Hollows, Rounds, Beads, Rabbets, Nosings, Case Mouldings, Quarter Rounds, &c. The most Compact and Serviceable Tool ever invented. Universally endorsed by carpenters.

AGENTS WANTED.

OTIS A. SMITH, Sole Mfr., Rockfall, Conn.



"THROUGH FRISCO'S FURNACE" EDITION DE LUXE

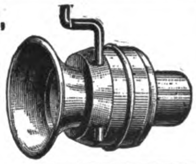
Illustrations of seven modern steel frame buildings at San Francisco, that withstood the earthquakes and fire of April 18th, 1906, with reports on the rust-resisting qualities of Dixon's Silica-Graphite Paint on the steelwork.

WRITE FOR A FREE COPY OF BOOK NO. B-32.

JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, U. S. A.

W. R. OSTRANDER & CO., 22 Dey Street, New York City,

Manufacturers of
Speaking Tubes, Whistles, Elevator, House and Hotel Annunciators and Bells, Electric Light Supplies.
Send for Catalogue.



Factory, 1431-1439 DeKalb Avenue, Brooklyn.

"Yankee" Tools.

No. 41—AUTOMATIC DRILL

No. 42—AUTOMATIC DRILL.

No. 50—RECIPROCATING DRILL FOR WOOD OR METALS.

The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up to date mechanic could buy tools of their quality and character. Other tools are very good tools, but "Yankee" Tools are better. "Yankee" Tools are sold by all leading dealers in Tools and Hardware. Ask your dealer to see them. Our Yankee Tool Book tells all about them. Sent free by

NORTH BROS. MFG. CO., Philadelphia, Pa.

A TOOL THAT'S STAMPED
STANLEY
IS THE BEST OF IT'S KIND

IMPROVED CARPENTERS' TOOLS

Sold by all Hardware Dealers

Stanley Rule and Level Co.
NEW BRITAIN, CONN., U. S. A.

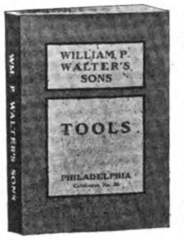
A COMPLETE FRAMING RULE
ON
NICHOLLS FRAMING SQUARE.

On the square is where the carpenter wants his figures, not in a book or on a piece of paper, as they are usually lost.

NICHOLLS MFG. CO.,
OTTUMWA, IOWA.

THE WILLIAMS PRINTING COMPANY, NEW YORK.

OUR LATEST CATALOGUE
No. 20



Handsomely printed on heavy paper, containing 450 pages, 2000 illustrations, including a full line of

Wood Working and Metal Working Tools, Foot Power Machinery, Lathes, etc.

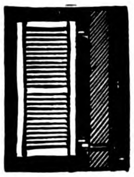
This is the largest and most complete catalogue we have ever issued, being a valuable hand book for any mechanic.

Sent on receipt of 20 cts. postage

WM. P. WALTER'S SONS
TOOL HEADQUARTERS
1233 Market St., Philadelphia

Please mention "Carpentry & Building."

Mallory Shutter Worker.



Works and locks the blinds from the inside. Ornamental, durable, perfect working. Applicable to old or new buildings.

Manufactured by
MALLORY MFG. CO.,
Flemington, N. J.

Use Our
Folding and Adjustable
Handle Draw Knife!

It is adjustable to any position, adaptable to the awkward places, absolutely rigid when set, handy and compact, a time saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

Write for Prices and Discounts.

A. J. WILKINSON & CO.,
180-188 Washington St., Boston, Mass., U.S.A

The Rich Handy Drawing Outfit

Saves Time

for the draughtsman and is a great aid to the learner. It holds a number of sheets or a pad, which requires no fastenings. The Protractor T Square gives accurate angles. You get measurements direct from the board. Has a drawer for instruments, and can be carried around to make drawings on the spot. Circulars free.

J. & G RICH, 122 N. 6th St., Phila, Pa.

GRINDSTONES

Mounted Grindstones for Carpenters' or Anybody's Use.

THE CLEVELAND STONE CO.
6th Floor, Hickox Bldg., CLEVELAND, O.

Alphabetical List of Advertisers.

American Column Co.	59
American Rolling Mill Co.	14
American Wood Working Machinery Co.	6
Asphalt Ready Roofing Co.	1
Baker McMillen Co.	65
Barnes, W. F. & John Co.	4
Barnes Tool Co.	5
Barnett, G. & H., Co.	1
Batavia Clamp Co.	66
Bee, J. D. Jr.	7
Berger Mfg. Co.	14
Bommer Bros.	1
Boston Bolt Co.	14
Bostrom-Brady Mfg. Co.	62
Boynton Furnace Co.	16
Bradt Publishing Co.	6
Bridgeport Chain Co.	68
Burlington Venetian Blind Co.	68
Burritt, A. W. Co.	59
Cabot, Samuel	1
Caldwell Mfg. Co.	61
Canton Mfg. Co.	7
Canton Steel Roofing Co.	13
Cardwell, C. W. Mfg. Co.	66
Chattanooga Roofing & Fdy. Co.	51
Chicago Machinery Exchange	6
Cincinnati Tool Co.	68
Cleveland Stone Co.	67
Coldwater Specialty Mfg. Co.	60
Columbia Mineral Wool Co.	16
Comstock, Wm. T.	68
Cordesman, Meyer & Co.	7
Cordesman-Rechtin Co.	8
Cortright Metal Rfg. Co.	11
Crescent Machine Co.	7
Davis & Cook	65
Diamond Expansion Bolt Co	15
Dieckman, F.	13
Disston, Henry & Sons	66
Dixon, Jos., Crucible Co.	67
Drouve, G. Co.	13
Eastern Granite Roofing Co.	12
Edwards Mfg. Co.	11
Eller Mfg. Co.	12
Engineers Equipment Co.	62
Fay, J. A. & Egan Co.	5
Floyd, Wells Co.	63
Ford Auger Bit Co.	68
Forest City Bit & Tool Co.	61
Foster Munger Co.	61
Fox Machine Co.	7
Fox, P. L.	65
French, Samuel H. & Co.	15
Frink, I. P.	68
Gage Tool Co.	16
Globe Ventilator Co.	15
Goodell Mfg. Co.	65
Grammes, L. F., & Sons.	63
Grand Rapids Hdw. Co.	7
Grand Rapids Wood Carving Co.	61
Grinnall Publishing Co.	15
Hamlin, G. R.	15
Hammacher, Schlemmer & Co.	64
Hartmann Bros. Mfg. Co.	61
Hess Warming & Ventilating Co.	63
Hitchings Co.	51
Howes, S. M., Co.	68
Hurley Machine Co.	8
Ideal Concrete Mch'y Co.	8
Imboden Harrow & Roller Co.	66
Interior Hardwood Co.	1
International Heater Co.	63
Ives, Hobart B. & Co.	65
Jennings, C. E. Co.	68
Johnson, E. J., Co	12
Johnson, S. C., & Son	57
Journal of Modern Construction	58
Kees, F. D. Mfg. Co.	62
Keighley, S. Metal Ceiling & Mfg. Co.	18
Kidder, R. E.	18
Kimball Bros. Co.	14
King Mfg. Co.	61
Kinnear & Gager Co.	14
Lane Bros. Co.	61
Lestershire Lumber & Box Co	15
Long Island Machinery Co.	6
Mallory Mfg. Co.	67
Marston, J. M. & Co.	5
Maryland Casualty Co.	9
Mesker & Bro.	13
Meyers, F. J. Mfg. Co.	5
Miller, A. W., Mfg. Co.	60
Millers Falls Co.	68
Montross Metal Shingle Co.	14
Morse, Williams & Co.	15
Morton, Thomas	60
Mullins, W. H. Co	11
National Mfg. Co.	61
National Roofing Co.	6
National Saw Co.	66
Nat'l Sheet Metal Rfg. Co.	15
New Jersey Zinc Co.	12
N. Y. Steel Corner Plate Co.	62
Nicholls Mfg. Co.	65&67
North Bros. Mfg. Co.	67
Ostendorf, W. H.	61
Ostrander, W. R. & Co.	67
Parks Ball Bearing Machinery Co.	5
Pettyjohn Co.	8
Phila. & Boston Face Brick Co.	16
Pike Mfg. Co.	1
Progressive Mfg. Co.	64
Reed & Auerbacher Co.	16
Rich, J. & G.	67
Richards Mfg. Co.	62
Sackmann, F. A.	15
Samson Cordage Works	68
Schaller-Hoerr Co.	60
Sedgwick Mch. Works	14
Seneca Falls Mfg. Co.	4
Shimer, Samuel J. & Sons.	9
Silver Lake Co.	68
Simonds Mfg. Co	16
Smith, Otis A.	67
Smith & Egge Mfg. Co.	65
Standard Paint Co.	10
Stanley Rule & Level Co.	67
Stanley Works	1
Star Encaustic Tile Co.	11
Starrett, L. S. Co.	1&68
Stowell Mfg. Co.	10
Streiinger, C. A. Co.	66
Taintor Mfg. Co.	68
Topp, G. A. & Co.	10
Tower & Lyon Co.	64
Tubular Heating & Ventilating Co.	63
U. S. Mineral Wool Co.	16
Van Dorn Iron Wks. Co.	5
Waddell Mfg. Co.	60
Walters, Wm. P. Sons	67
Warner Elevator Mfg. Co.	14
Washburne, E. G. & Co.	14
Wheeling Corrugating Co.	10
White, Van Glahn & Co.	68
Wilkinson, A. J. & Co.	67
Willis Mfg. Co.	11
Wood-Mosaic Flooring Co.	16
Yale & Towne Mfg. Co.	62

Classified List of Advertisers.

Annunciators
Ostrander, W. R. & Co.

Architects' Blue Prints

Architects' Details
Lestershire Lumber & Box Co.

Asbestos
Stowell Mfg. Co.

Auger Bits
Ford Auger Bit Co.
Jennings, C. E. Co.

Awnings
Chattanooga Roofing & Fdry. Co.

Band Saws
American Wood Working Machinery Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Crescent Machine Co.
Fay, J. A. & Egan Co.

Blackboards, Slate
Johnson, E. J. Co.

Blinds
Burlington Venetian Blind Co.
Foster-Munger Co.
Schaller-Hoerr Co.

Blind Hinges
Stanley Works

Bolts and Nuts
Boston Bolt Co.

Books
Arthur, Wm.
Bradt Publishing Co.
Comstock, Wm. T.
Grinnall Pub. Co.
Williams, David, Co.

Boring Machines
Fox Machine Co.
Millers Falls Co.

Brace Chucks
Imboden Harrow & Roller Co.

Builders' Hardware
Boston Bolt Co.
Hammacher, Schlemmer & Co.
Yale & Towne Mfg. Co.

Building Brackets, Folding
Stanley Works
Tower & Lyon Co.

Building Material
Lestershire Lumber & Box Co.

Building Paper and Felt
Cabot, Samuel.
Standard Paint Co.

Builders' Supplies
Schaller-Hoerr Co.

Butts and Hinges
Stanley Works.

Capitals
Grand Rapids Wood Carving Co.
Waddell Mfg. Co.

Ceiling, Metallic
Berger Mfg. Co.
Canton Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Keighley, S. Metal Ceiling & Mfg. Co.
Kinnear & Gager Co.
Wheeling Corrugating Co.
Willis Mfg. Co.

Cement
French, S. H. & Co.

Chucks, Brace
Imboden Harrow & Roller Co.

Clamps
Batavia Clamp Co.
Cincinnati Tool Co.

Concrete Block Machines
Ideal Concrete Mchy. Co.
Pettyjohn Co.

Conductor Pipe and Elbows
Canton Mfg. Co.
Dieckmann, F.

Conductor Pipes
American Rolling Mill.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.

Conductor Shoes
Dieckmann, F.

Contractors' Supplies
Boston Bolt Co.

Cornices, Sheet Metal
Berger Mfg. Co.
Canton Mfg. Co.
Chattanooga Roofing & Foundry Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Mesker & Bro.
Mullins, W. H. Co.
Willis Mfg. Co.

Cresting
Van Dorn Iron Works Co.
Willis Mfg. Co.

Cutter Heads
Shimer, Sam'l J. & Sons.

Designs and Details
(See House Plans)

Door Checks and Springs
Hammacher, Schlemmer & Co.

Door Checks, Screen
Caldwell Mfg. Co.

Door Hangers
Lane Bros. Co.
National Mfg. Co.

Draftsmanship
Engineers Equipment Co.

Draw Knives.
Wilkinson, A. J. & Co.

Drawing Outfits
Comstock, Wm. T.
Rich, J. & G.

Drying Stoves
Drouve, G. Co.
Howes, S. M. Co.

Dumb Waiter Fixtures
Hammacher, Schlemmer & Co.

Eave Troughs
Chattanooga Roofing & Fdry. Co.
Eller Mfg. Co.
Wheeling Corrugating Co.

Elevators and Dumb Waiters
Kimball Bros. Co.
Meyers, F. J. Mfg. Co.
Morse, Williams & Co.
Sedgwick Machine Works.
Warner Elevator Mfg. Co.

Etching Fluid
Reed & Auerbacher Co.

Expansion Bolts
Boston Bolt Co.
Diamond Expansion Bolt Co.

Files and Rasps
Barnet, G. & H. Co.
Boston Bolt Co:

Floor Scrapers
Hurley Machine Co.

Framing Tools
Topp, G. A., & Co.

Furnaces and Heaters
Boynton Furnace Co.
Floyd-Wells Co.
Hess Warming & Ventilating Co.
International Heater Co.
Tubular Heating & Ventilating Co.

Gas and Electric Fixtures
Frink, I. P.

Grates, Fancy Plated
Chattanooga Roofing & Fdry. Co.

Greenhouses
Hitchings & Co.

Grille Work, Wood
Foster-Munger Co.
Waddell Mfg. Co.

Grindstones
Cleveland Stone Co.
Richards Mfg. Co.

Grooving Heads
Fox Machine Co.

Hangers, Barn Door
Richards Mfg. Co.

Hangers, House Door
Richards Mfg. Co.

Hardware Jobbers
White, Van Glahn & Co.

Hardware Specialties
Richards Mfg. Co.

Heaters.—*Steam and Hot Water.*
International Heater Co.

Hinges, Spring
Bommer Bros.

Hinges, Window Screen
Kees, F. D. Mfg. Co.

House Plans
Comstock, Wm. T.

Insurance, Liability
Maryland Casualty Co.

Iron House Fronts
Mesker & Bro.

Iron Work
Van Dorn Iron Works Co.

Lath, Metal
Wheeling Corrugating Co.

Levels
Baker, McMillen Co.
Bostrom-Brady Mfg. Co.
Davis & Cook.

Liability Insurance
Maryland Casualty Co.

Lightning Rods
Washburn, E. G. & Co.

Locks
Yale & Towne Mfg. Co.

Lumber and Shingles
Lestershire Lumber & Box Co.

Mantels
Burritt, A. W., Co.
Foster-Munger Co.
French, Sam'l H. & Co.
Ostendorf, W. H.
Phila. & Boston Face Brick Co.

Masons' Stoves
Drouve, G. Co.

Mill Work
Schaller-Hoerr Co.

Mineral Wool
Columbia Mineral Wool Co.
U. S. Mineral Wool Co.

Miter Boxes
Goodell Mfg. Co.
Nicholls Mfg. Co.

Miter Machines
Fox Machine Co.

Miters
Fox, P. L.

Moldings
American Column Co.
Grand Rapids Wood Carving Co.
Schaller-Hoerr Co.
Waddell Mfg. Co.

Mortar Colors
French, Sam'l H. & Co.

Mortisers, Hand
Miller, Albert W., Mfg. Co.

Oil Filters
Burt Mfg. Co.

Ornamental Sheet Metal Work
Mullins, W. H. Co.

Ornamental Wire, Iron, Steel and Brass Work
Meyers, F. J. Mfg. Co.

Paint
New Jersey Zinc Co.
Standard Paint Co.

Parquette Flooring
Interior Hardwood Co.
Wood-Mosaic Flooring Co.

Patent Lawyers
Hamlin, Geo. R.

Pencils
Dixon, Jos. Crucible Co.

Planes
Gage Tool Co.
Smith, Otis A.
Tower & Lyon Co.

Plasterers' Corner Plates
New York Steel Corner Plate. Co.

Plastic Ornaments
French, Samuel H. & Co.

Porch Columns
American Column Co.
Hartman Bros. Mfg. Co.

Publications
Journal of Modern Construction.

Reflectors
Frink, I. P.

Roofing, Art Metal Tile
Mullins, W. H. Co.

Roofing and Siding
Asphalt Ready Roofing Co.
Berger Mfg. Co.
Canton Mfg. Co.
Canton Steel Roofing Co.
Drouve, G. Co.
Eastern Granite Roofing Co.
Edwards Mfg. Co.
Eller Mfg. Co.
Lincoln Waterproof Cloth Co.
National Roofing Co.
Standard Paint Co.
Stowell Mfg. Co.
Wheeling Corrugating Co.

Roofing Brackets
Stanley Rule & Level Co.

Roofing Paint
Asphalt Ready Roofing Co.
Dixon, Jos. Crucible Co.

Roofing Slate
Johnson, E. J. Co.

Sash Balances
Caldwell Mfg. Co.

Sash Chains
Bridgeport Chain Co.
Morton, Thomas.
Smith & Egge Mfg. Co.

Sash Cord
Samson Cordage Works.
Silver Lake Co.

Sash Locks
Ives, H. B. & Co.

Sash Operating Devices
Hitchings & Co.

Sash Pulleys
Grand Rapids Hardware Co.

Sashes, Doors and Blinds
Foster-Munger Co.
Lestershire Lumber & Box Co.

Saw Clamps
Cardwell, C. W., Mfg. Co.
Disston, Henry & Sons.

Saw Filing Guide
Disston, Henry & Sons.

Saw Jointers
Crescent Machine Co.

Saw Sets
Taintor Mfg. Co.

Saw Tables
Chicago Machinery Exchange.
Crescent Machine Co.
Kidder, R. E.

Saw Vises
Grammes & Sons.

Saws
Disston, Henry & Sons.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
National Saw Co.
Simonds Mfg. Co.

Screw Drivers
North Bros. Mfg. Co.

Sheet Metal Fronts
Mesker & Bro.

Shingles and Tiles, Metallic
Berger Mfg. Co.
Chattanooga Roofing & Foundry Co.
Cortright Metal Roofing Co.
Montross Metal Shingle Co.
National Sheet Metal Roofing Co.
Wheeling Corrugating Co.
Willis Mfg. Co.

Shingles Hip
Wheeling Corrugating Co.

Shingle Stains
Cabot, Samuel.

Shingling Kits
Coldwater Specialty Co.

Shutter Worker
Mallory Mfg. Co.

Shutters (See Blinds)

Skylight Lifts
Bee, J. D., Jr.

Skylights
Canton Mfg. Co.
Canton Steel Roofing Co.
Chattanooga Roofing & Fdry. Co.
Drouve, G. Co.
Edwards Mfg. Co.
Mullins, W. H. Co.
Willis Mfg. Co.

Speaking Tubes
Ostrander, W. R. & Co.

Spring Hinges
Bommer Bros.

Squares
Fox, P. L.
Nicholls Mfg. Co.

Steel Figures and Letters
Sackman, F. A.

Stoves and Ranges
Boynton Furnace Co.

Structural Iron and Steel Works
Boston Bolt Co.

Structural Slate
Johnson, E. J. Co.

Tiling
Ostendorf, W. H.
Star Encaustic Tile Co.

Tool Boxes
Walter's Sons, W. P.

Tool Cabinets
Hammacher, Schlemmer & Co.

Tool Chests
Jennings, C. E. Co.

Tools
Forest City Bit & Tool Co.
Gage Tool Co.
Hammacher, Schlemmer & Co.
Jennings, C. E. Co.
Millers Falls Co.
North Bros. Mfg. Co.
Progressive Mfg. Co.
Reed & Auerbacher Co.
Smith, Otis A.
Stanley Rule & Level Co.
Starrett, L. S., Co.
Streiinger, C. A., Co.
Tower & Lyon Co.
Walter's Sons, Wm. P.
Wilkinson, A. J., & Co.

Turned, Molded Carved Work
Waddell Mfg. Co.

Ventilating Attachment
Drouve, G., Co.

Ventilators
Globe Ventilator Co.

Veranda Stock
American Column Co.

Vises
Hammacher, Schlemmer & Co.

Vises, Circular Saw
Grammes & Sons.

Wagon Jacks
Batavia Clamp Co.

Wax, Finishing and Polishing
Johnson, S. C., & Son.

Weather Strips
Hammacher, Schlemmer & Co.
King Mfg. Co.

Window Apparatus
Drouve, G. Co.

Windowand Door Stops
King Mfg. Co.

Window Fasteners
Stanley Works.

Window Stop Adjusters
Ives, Hobart B., & Co.

Window Trimmings
Caldwell Mfg. Co.

Windows, Fireproof
Mullins, W. H. Co.

Wood Carving
Grand Rapids Wood Carving Co.

Wood Mantels
(See Mantels)

Wood Ornaments
Waddell Mfg. Co.

Wood Trimmers
Fox Machine Co.

Wood Working
Lestershire Lumber & Box Co.

Wood Working Machinery
American Wood Working Mach'y Co.
Barnes, W. F. & John.
Barnes Tool Co.
Chicago Machinery Exchange.
Cordesman, Meyer & Co.
Cordesman-Rectin Co.
Fay, J. A. & Egan Co.
Fox Machine Co.
Kidder, R. E.
Long Island Machinery Co.
Marston, J. M. & Co.
Parks Ball Bearing Machinery Co.
Seneca Falls Mfg. Co.

Wood Working Machinery, Second Hand
Long Island Machinery Co.

5,000 "LITTLE GIANT" FLOOR SCRAPERS

NOW IN USE
ARE YOU USING ONE?

FOR OAK
MAPLE
BIRCH
BEECH
YELLOW PINE
PARQUET
RUBBER
AND LINOLEUM
Floors

Scrapes every inch of floor, into corners and along baseboard

Ask your dealer for prices.

To scrape floor operator pulls machine.

The Old Way

Two Squares in Eight Hours

One man will scrape, by hand, about two squares, or two hundred square feet of flooring, in eight hours. The wage scale for this is from 40 cents to 55 cents per hour, or from $3.20 to $4.40 for 200 square feet, which is $1.60 to $2.20 per square.

The New Way

Eight Squares in Eight Hours

One man with a "LITTLE GIANT" FLOOR SCRAPER will scrape eight squares, or 800 square feet of flooring, in eight hours, which at the wage scale of from 40 cents to 55 cents per hour, would be 40 cents to 55 cents per square.

PAYS FOR ITSELF IN A FEW DAYS

SAVING

A saving is therefore made of from $1.20 to $1.65 per square.
On 5,000 square feet (50 squares), the saving will be from $60.00 to $82.50.
We furnish one dozen knives with each machine, and they will scrape 30,000 square feet of flooring.

Sold under our guarantee to do better, faster and cheaper work than any other method.

MANUFACTURED BY THE

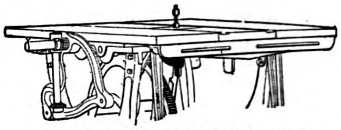
HURLEY MACHINE COMPANY

General Offices & Works, 153-159 S. JEFFERSON ST., CHICAGO, U.S.A.

New York, FLAT IRON BUILDING SAN FRANCISCO

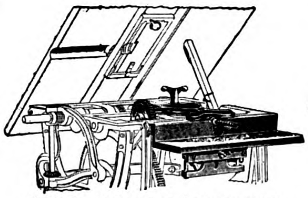
When You Are Rushed With Work

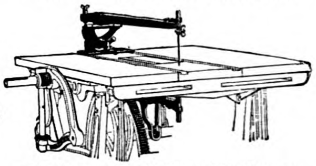
And can't get all of the help you need, then get a "Union" Combination Saw, which will do work equal to 3 additional good men and will do better work than is possible, when using hand tools. The saving of 3 men's wages will soon pay for the machine and means larger profits for you.


"Union" Moulding Attachment.

No. 5 "Union"

Combination
Self-Feed Rip
and Cross-Cut
Saw


"Union" Boring Attachment.

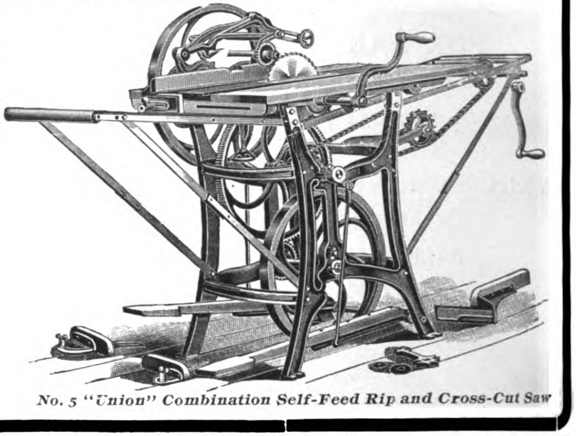

"Union" Scroll Saw Attachment.

is suitable for various kinds of work—ripping (up to 3½ inches thick), cross-cutting, mitering, etc., and, with additional attachments, rabbetting, grooving, dadoing, boring, scroll-sawing, edge-moulding, beading, etc. Almost a complete workshop in one machine.

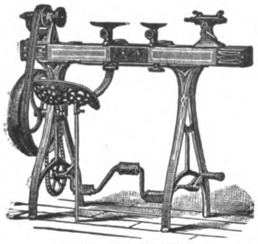
Send for Catalog "A" fully describing our complete line of foot, hand and light power wood working machinery.

The Seneca Falls Mfg. Co.
209 Water St.,
SENECA FALLS, N. Y., U. S. A.

114


No. 5 "Union" Combination Self-Feed Rip and Cross-Cut Saw

HAND POWER FOOT
WOOD-WORKING MACHINERY.


No. 3 LATHE.

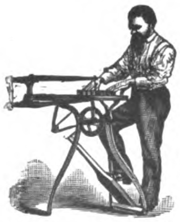
A Complete Line for a Carpenter and Builder.


Tenoner.

Our Machines are so constructed that you can take them to the house you are building.

. . . Saves Time.


No. 2 SCROLL SAW.


No. 7 SCROLL SAW.

Any of our machines will pay for themselves in a year and often in a single job.

Why buy these Machines? BECAUSE

You can save a mill man's profit.
You can make more money with less capital invested.
You can manufacture in as good style and finish, and at lower cost than the mill.
You can work up stuff ahead in winter for the spring rush in building
10,000 builders are using from one to eight of our different machines.

Our machines are not complicated, but simple, strong, practical and built for good hard work.


FORMER.


No. 4 SAW.


MORTISER


HAND RIPSAW.

Send for Catalogue and Prices.

W. F. & JOHN BARNES CO., 71 RUBY ST.
ROCKFORD, ILL

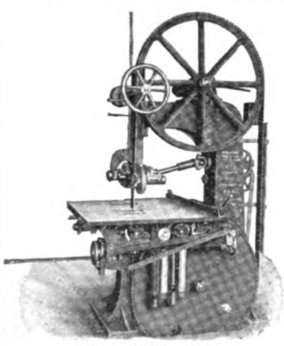
An Excellent Combination

In this age of combines there are none that will conduce to your profit like the **Fay & Egan No. 146 Combined Band, Rip and Resaw.** An invaluable tool where floor space is limited and not enough work to keep two machines busy. Added to this is the immense saving in kerf, otherwise wasted in saw dust where circular saws are used

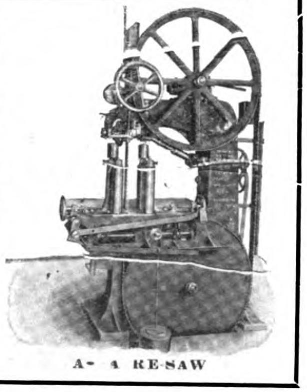
This machine may be instantly changed from rip to resaw, or vice versa, and is equipped with our patent **Sensitive Knife Edge Straining Device**. which automatically adapts itself to all undue strain on the saw, permitting of high speed with entire safety.

Write to-day for Circular.

J. A. Fay & Egan Co.
221-241 W. Front St., Cincinnati, Ohio.
The World s Standard for Woodworking Machinery.

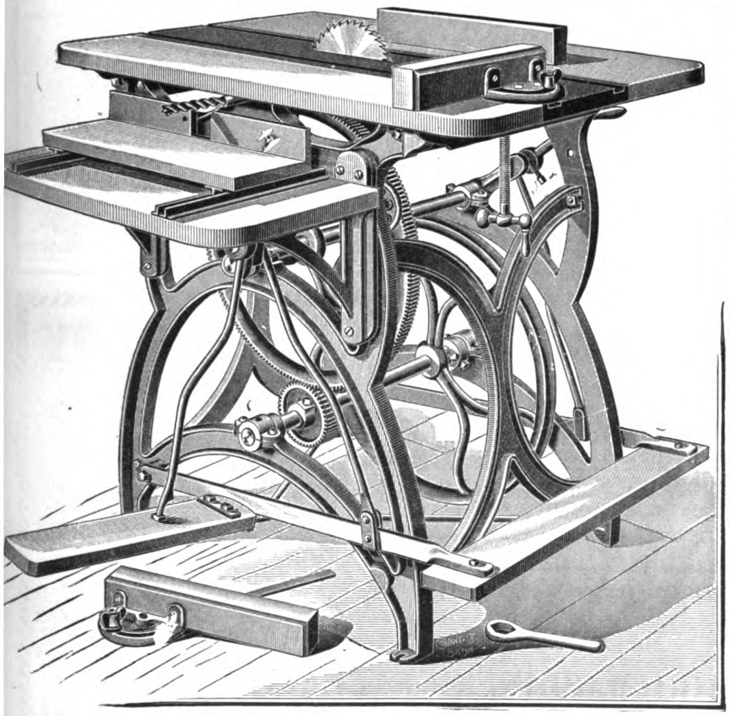


AS A RIP SAW



AS A RE-SAW

Marston's Hand and Foot Power Circular Saw.



Iron frame, 36 inches high.
Center part of top is made of iron accurately planed, with grooves on each side of saw for gauges to slide in.
Steel shafts and best babbitt metal boxes.
Gears are all machine-cut from solid iron.
Boring table and side treadle.
Two 7-inch saws and two crank handles with each machine.
Weight complete, 350 pounds.
Send for catalogue.

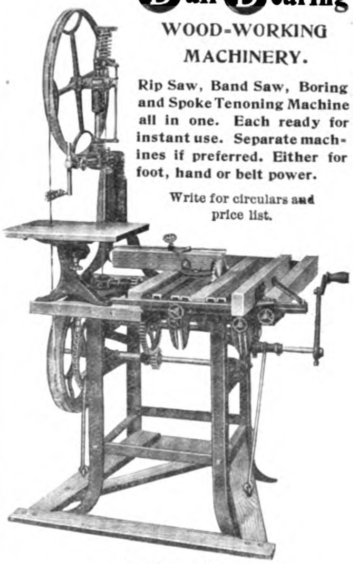
J. M. MARSTON & CO., 201 Ruggles St., Boston, Mass.

VAN DORN IRON WORKS CO
CLEVELAND, OHIO.
STRUCTURAL STEEL & ORNAMENTAL IRON WORK.
JAIL WORK, JOIST HANGERS, IRON FENCINGS.

Ball Bearing
WOOD-WORKING MACHINERY.

Rip Saw, Band Saw, Boring and Spoke Tenoning Machine all in one. Each ready for instant use. Separate machines if preferred. Either for foot, hand or belt power.

Write for circulars and price list.



Manufactured by
Parks Ball Bearing Machine Co.
Sta. A. CINCINNATI, OHIO

ALL KINDS OF
ELEVATOR CARS AND ENCLOSURES

Bank and Office Railing.

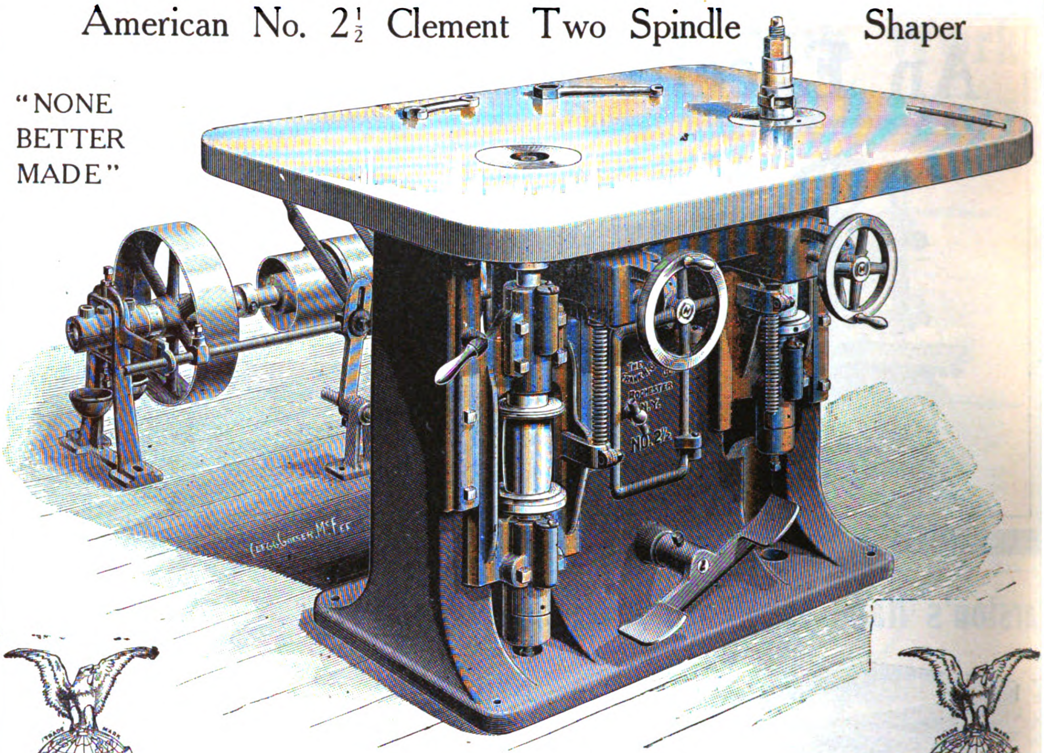
Send for Catalog.

FRED J. MEYERS MFG. CO.
HAMILTON, OHIO

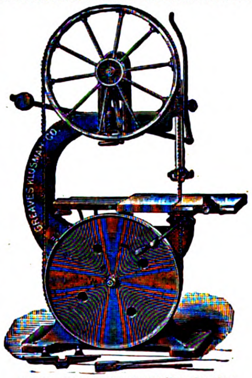
THE IMPROVED Hand and Foot Power E. F. B.
SAWING MACHINE.
For Carpenters, Builders and All Wood Workers Who Have Shops Without Power.
SEND FOR CIRCULAR.
THE BARNES TOOL CO., New Haven, Conn.

American No. 2½ Clement Two Spindle Shaper

"NONE BETTER MADE"



AMERICAN
WOOD WORKING MACHINERY CO.
New Orleans Chicago New York



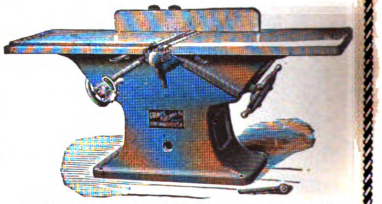
NEW PATENT 36-INCH BAND SAWING MACHINE.

WOOD WORKING MACHINERY
FOR
Carpenters and Builders

Don't fail to visit our exhibit when in Chicago.
Machinery of all descriptions for your inspection.

UP TO DATE MACHINERY
For the Progressive Carpenter

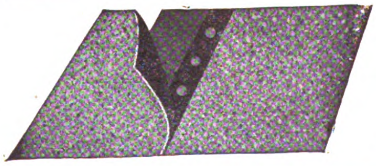
Write for prices on rebuilt
MACHINERY



IMPROVED HAND PLANER AND JOINTER.

Tables over 7 feet long and have steel lips.
Cylinder Slotted to receive moulding bits and other irregular knives.
Cylinder has three Bearings, one of which is outside of pulley.

CHICAGO MACHINERY EXCHANGE, 13-15 No. Canal St., CHICAGO, ILL.



"Security Roofing"
(Reg. U. S. Patent Office)
Has a patent six joint with no nails driven through the top sheet.
Made to be laid and then forgotten.
Beware of Infringements.
NATIONAL ROOFING CO., Tonawanda, N. Y.

LONG ISLAND MACHINERY CO.
New and Second-hand Wood Working Machinery Bought, Sold and Exchanged
ENTIRE PLANTS BOUGHT AND EQUIPPED
Junction Kent and Washington Avenues, BROOKLYN, N. Y.

SUCCESSFUL ESTIMATING!

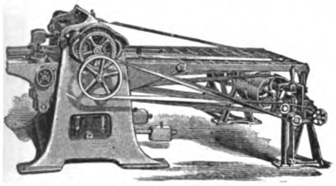
Your success depends upon your estimating the cost correctly. The new, enlarged, illustrated, fourth edition of The Lightning Estimator teaches you to estimate house work in an easy, simple, rapid, accurate and practical manner. Gives actual cost of each separate part of the labor and material, but so combines figures so as to lessen risk of errors and omissions Saves the time usually spent in the old. tiresome way you are using. Builders who have the book write us they are able to estimate an ordinary house in 30 to 60 minutes. Prepared by a prominent builder from actual experience, not theory. Previous editions have had the most phenomenal sale of any book of its kind ever offered the public. Waterproof covers. Price $1.00 (Money order or bill). Send at once and get on the safe side.

BRADT PUB. CO.
260 Michigan Ave., Jackson, Mich.

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google

CORDESMAN, MEYER & CO., 26, 28 and 30 Central Avenue

CINCINNATI, OHIO.

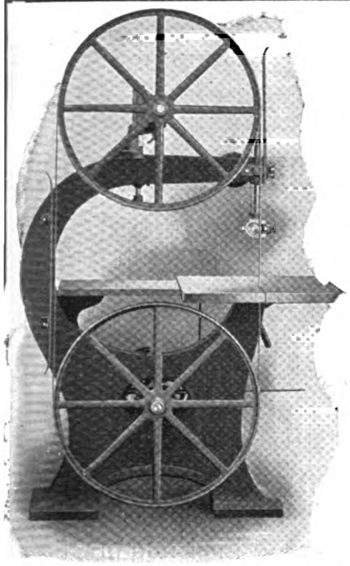


No. 2 Planer, Matcher and Moulder.

Manufacturers of Latest Improved

Wood-Working Machinery

Universal Wood-Worker



The Rigid Construction and Modern Design of the New 36-inch CRESCENT BAND SAW insure a machine of the very highest efficiency as a rapid producer of accurate work.

CRESCENT machines cost less than others of equal merit.

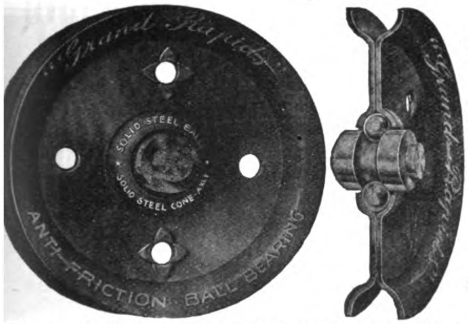
They are best because they are strong, durable and practical.

They are low in price because they are in big demand and we have to build them in large quantities.

Send at once for catalogue describing our complete line of BAND SAWS, SAW TABLES and JOINTERS.

THE CRESCENT MACHINE COMPANY, 206 Main Street, Leetonia, Ohio, U.S.A.

PATENT PENDING.



"Ball-Bearing Grand Rapids All-Steel Sash Pulleys

Are sold DIRECT to BUILDERS, CONTRACTORS and MILLS,

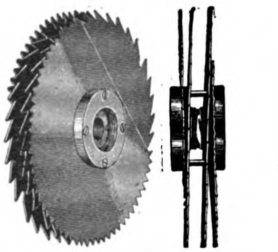
At prices under the common ordinary goods.

If you make ten or ten thousand window frames, we can save you money and give you a superior sh pulley. We are the largest sash-pulley makers in the world. We ship direct, or through dealers d jobbers everywhere.
Write for catalogue and free samples and prices on half-gross, gross, barrel or any quantity.

Direct from the Makers to you. Inquiries welcome.

GRAND RAPIDS HARDWARE CO.,
PEARL STREET - - - GRAND RAPIDS, MICH.

FOX



Adjustable Saw Dado Heads
The best thing for cutting grooves.

Fox Foot Power Miter Machines
The best thing for mitering mouldings and similar work.

We also make

Universal Trimmers, Boring Machines, Lathes, Planers, etc.

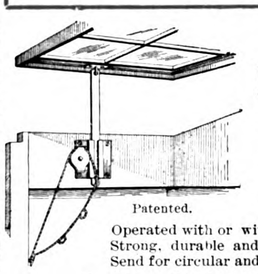
FOX MACHINE CO.
387 N. Front St., Grand Rapids, Mich.

CORNICE, SKYLIGHTS, FINIALS

VENTILATORS
CONDUCTOR PIPE
METAL WINDOWS
METAL CEILINGS

Cat. on application.

The Canton Manufacturing Co , Canton, Ohio



Bee Easy Sky-light Lifts

Patented.

Operated with or without a cord
Strong, durable and inexpensive.
Send for circular and price.

J. D. BEE, Jr.
88 West Neptune St., West Lynn, Mass.

PETTYJOHN

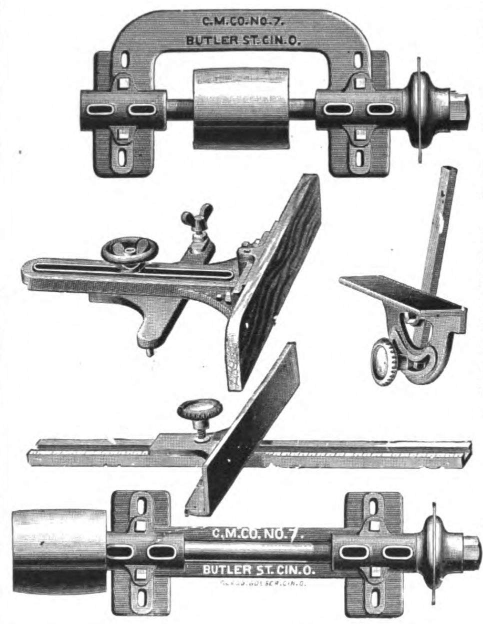
Portable Hollow Concrete Block Machine

BEST—FASTEST—SIMPLEST—CHEAPEST
MOVE THE MACHINE—NOT THE BLOCKS

Saves labor of off-bearing, avoids loss by crackage or breakage, saves expense of heavy cumbersome iron pallets. Sand, Water and Portland Cement only materials required. BIG PROFITS. Blocks cost 6 cents to make. Sell for 18 cents. Whole outfit costs $125.00.

FULLY GUARANTEED. SENT ON TRIAL.

THE PETTYJOHN CO.,
616 North 6th St., TERRE HAUTE, IND.



SAW MANDRELS, RIP & CROSS-CUT GAUGES.

We are not only prepared to take care of your wants in the large woodworking machine line, but also give special attention to your needs in the supply line, being prepared to furnish all sizes and styles of Saw Mandrels, Rip and Cross Cut Gauges, etc.

Advise us of your requirements.

THE
Cordesman-Rechtin Co.,
Cincinnati, Ohio.

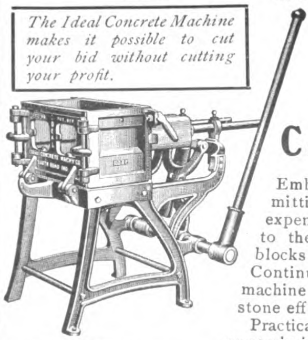
To Make The Winning Bid

The Ideal Concrete Machine makes it possible to cut your bid without cutting your profit.

It is impossible to underbid the contractor who manufactures his own Ideal Concrete Building Blocks with an Ideal Concrete Machine.

The marvelous simplicity and rapidity of the Ideal Machine makes it possible to produce Ideal Concrete Blocks at a cost that makes the lowest bid a profitable one. May be successfully operated by any one without previous experience or other assistance.

Ideal Blocks are adapted to any possible architectural design, and excel all other materials in fire and weather-proof qualities.



IDEAL Concrete Machinery

Embodies the only principle (face down) permitting the use of rich facing material with less expensive material in back of blocks. Adaptable to the manufacture of five different systems of blocks — Hollow, Solid, Veneer, Two piece, and Continuous, in various shapes and sizes. The same machine makes countless designs of face, and natural stone effect. (See illustration.)

Practically everlasting. Not a chain, spring, wheel or cog in its construction.

Catalogue and valuable facts for builders free on application.

IDEAL CONCRETE MACHINERY CO., Dept. O, Sth. Bend, Ind.
W. H. C. MUSSEN & CO., Montreal, Canada,
Sole Agents for Canada.

Intricate Figuring Not Required.

Did you ever get more than a partial mastery of the formula ordinarily employed for calculating the strength or bearing capacity of beams, floors and roofs, and how much of it can you put into practical use?

Kidder's Strength of Beams, Floors and Roofs

is a book designed for the man who is not versed in mathematics.

Prepared specially to meet the requirements of young architects, carpenters, builders, and within the reach of any one who is interested in building construction.

222 Pages; 164 Illustrations
$2.00 Prepaid.

DAVID WILLIAMS COMPANY,
14-16 Park Place, - NEW YORK

Assets over
$3,400,000.00

MARYLAND CASUALTY COMPANY
MERITS COMPLETE CONFIDENCE

Surplus
to Policyholders
$1,669,287.04

Employers' Liability Insurance

You no doubt carry this class of insurance — all progressive and prudent employers of labor do.

But are you sure that you have the best policy?

Is your policy one of those that is packed with conditions and provisos, that doesn't cover half of what you need it to; or is it conditionless, written in simple language, and giving absolute protection for a reasonable premium?

There is only one such policy, and that is issued by the

MARYLAND CASUALTY COMPANY.

This policy is the result of the mature thought of experienced underwriters, and is such a notable improvement over other policies that we have named it

THE PERFECT FORM OF LIABILITY INSURANCE.

You ought to know more about this matter.

Write for our booklet Form 125-A.

The Maryland continues to sell, at fair rates, the Standard Form of Liability policy, which is as good as the best sold by any other company.

Maryland Casualty Company
Baltimore, Maryland.

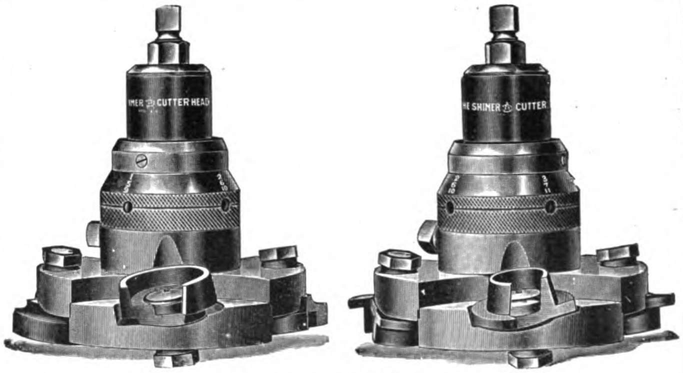
The company also writes — Fly Wheel, Burglary, Sprinkler Leakage, Elevator, Teams, Steam Boiler, Water Damage, Physicians' Defense, Plate Glass, Personal Accident. Disability, Health, and all other classes of Casualty Insurance.

Selected Books For Carpenters

Hicks' Builders' Guide	$1.00
Meloy's Progressive Carpentry	1.00
Sylvester's Modern Carpentry and Building	1.50
Kidder's Building Construction and Superintendence, Volume 2—Carpenter's Work	4.00
Hodgson's Practical Uses of the Steel Square, Volumes 1 and 2, each	1.00
Hodgson's Modern Carpentry and Joinery	1.00
Shawver's Plank Frame Barn Construction	0.50
Stoddard's Steel Square Pocket Book	0.50
People's Pocket Stair Builder and Carpenter's Handbook	2.50
Maginnis' How to Measure Up Wood-Work for Buildings	0.50
Hodgson's Up-To-Date Hardwood Finisher	1.00
Maire's The Modern Wood Finisher	0.50
Easy Lessons in Roof Measurements	0.25
How to Become a Good Mechanic	0.25

Our Descriptive List of books for the Building Trades sent on request.

David Williams Co.,
14-16 Park Place, NEW YORK



Best of All, Fig. 202 and Fig. 203.

THE SHIMER CUTTER HEAD

Is Within the Reach of Every Flooring Maker

No reason why any man in the business should follow "out-of date" methods with his cast iron blocks and straight knives when the actual "fit and try" of it is automatically arranged for in the construction of The Shimer Circular Cutter and alternate seat clearance feature. YOU SAVE THE TIME—THE WORRY—THE ANNOYANCE necessitated by hand fitting, hence you have something to gain in the adoption of the only tools that have developed by deliberation and forethought to keep pace with the growing needs of the trade.

AND THEY GO TO YOU ON TRIAL

for thirty days—returnable if unsatisfactory—when you send us carefully taken measurements of your machine. Send for question blank and full particulars. Address

SAMUEL J. SHIMER & SONS, MILTON, PENNSYLVANIA

OUR 84 PAGE CATALOGUE

Gives essential facts about the
best books for the building trades

SEND YOUR ADDRESS

DAVID WILLIAMS CO. 14-16 Park Place NEW YORK

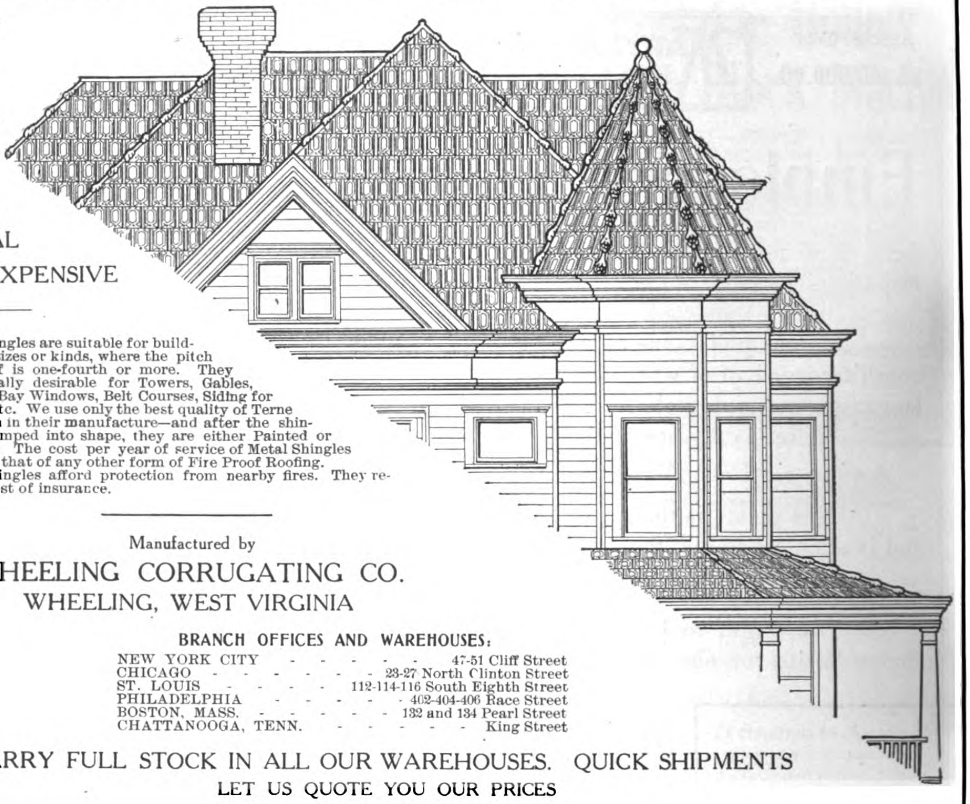
DIXIE METAL SHINGLES—SO—EASY—TO—LAY—FIRE PROOF—

Weather Proof

A Perfect Lock

ORNAMENTAL

NOT EXPENSIVE



Metal Shingles are suitable for buildings of all sizes or kinds, where the pitch of the roof is one-fourth or more. They are especially desirable for Towers, Gables, Mansards, Bay Windows, Belt Courses, Siding for Cottages, etc. We use only the best quality of Terne Roofing Tin in their manufacture—and after the shingles are stamped into shape, they are either Painted or Galvanized. The cost per year of service of Metal Shingles is less than that of any other form of Fire Proof Roofing.

Metal Shingles afford protection from nearby fires. They reduce the cost of insurance.

Manufactured by

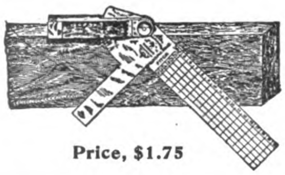
WHEELING CORRUGATING CO.
WHEELING, WEST VIRGINIA

BRANCH OFFICES AND WAREHOUSES:

NEW YORK CITY	47-51 Cliff Street
CHICAGO	23-27 North Clinton Street
ST. LOUIS	112-114-116 South Eighth Street
PHILADELPHIA	402-404-406 Race Street
BOSTON, MASS.	132 and 134 Pearl Street
CHATTANOOGA, TENN.	King Street

WE CARRY FULL STOCK IN ALL OUR WAREHOUSES. QUICK SHIPMENTS

LET US QUOTE YOU OUR PRICES



Price, $1.75

TOPP'S FRAMING TOOL.

A PERFECT TOOL and the only Tool for the purpose ever invented.

Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS. It is accurate, thus preventing all mistakes. It gives angles for any pitch. It gives lengths for any rafters. It gives cuts for principals, jacks, hips, valleys and cripples. Saves time for the skilled mechanic, and enables the ordinary workman to frame roofs with absolute certainty.

Write for booklet. Address the manufacturers,

G. A. TOPP & CO., - Indianapolis, Ind.

SECURE
PROTECTION AND LONG
SERVICE BY USING OUR
ASPHALT ROOFING
SAVES REPAIRS
SAVES RECOATING
SAVES RENEWING
Send for Samples and Pamphlet
STOWELL MFG. CO.
JERSEY CITY, N.J.

RUBEROID
RED
ROOFING

PAT. NOV. 22, 1904.

FOR 15 YEARS

RUBEROID HAS BEEN RECOGNIZED AS THE STANDARD PREPARED ROOFING. AS NOW MADE IN COLORS, RED AND BROWN, IT ENSURES YOU

A PERMANENT ROOFING
WITH
A PERMANENT COLOR.

A COMBINATION OF BEAUTY AND WEATHER AND FIRE PROTECTION. ANY HANDY MAN CAN APPLY IT.

SEND FOR SAMPLES.

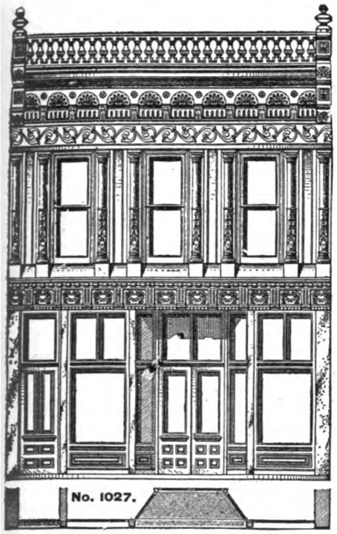
THE STANDARD PAINT COMPANY
Sole Manufacturers,
100 William Street, New York.

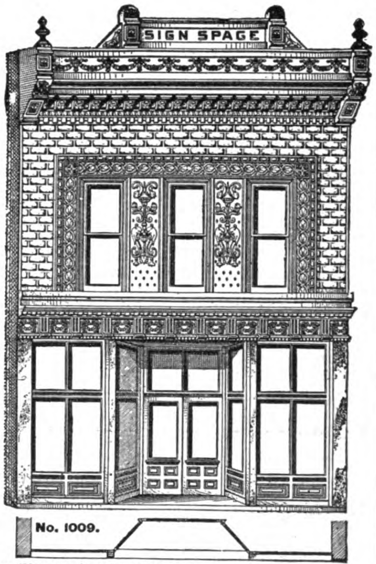
RUBEROID is the only prepared roofing which can truthfully be said to outlast metal and shingles, Costs less. easier to apply, requires less attention. Makes a sound, seam-tight roof, flat or sloping, unaffected by expansion or contraction, and suitable for poultry house, barn or handsome residence.

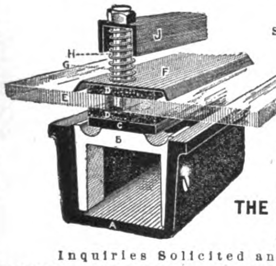
RUBEROID contains no tar, paper, rubber or other short-lived ingredients to crack, dry up and become useless with age. Made from the finest wool felt, saturated with a patented water-proof and fire-resisting compound. Retains its elasticity and flexibility indefinitely.

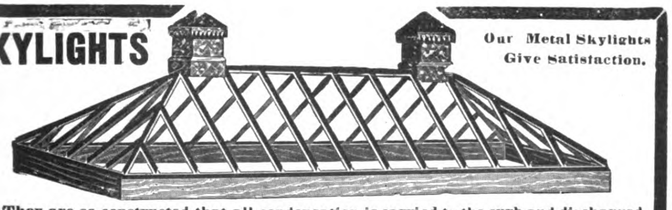
Any handy man can apply it. Full instructions and fixtures free with every roll. Let us tell you more about Ruberoid. Write for samples and booklet

THE STANDARD PAINT COMPANY,
SOLE MANUFACTURERS,
100 William St., New York.
Chicago, Cincinnati, St. Louis.


No. 1027.


SIGN SPACE
No. 1009.


J
H
G
F
E
D
D
C
B
A



"AMERICAN"

Polygon Conductor Pipe

Can be furnished in either Galvanized Iron or Copper. It is made from galvanized iron in 10-ft. lengths, without a cross seam; from copper in 8-ft. lengths.

American Rolling Mill Co., MIDDLETOWN, OHIO.

STORE ELEVATOR FOR 105

COMPLETE, READY TO ERECT, MADE BY THE HUNDRED. SIMPLE IN CONSTRUCTION. EASILY CARED FOR. OTHER STYLES AND PRICES TO SUIT.

The Warner Elevator Mfg. Co.
2100 Valley St., CINCINNATI, O.
NEW YORK OFFICE: 2032 PARK ROW BUILDING

ARCHITECTS! CONTRACTORS! BUILDERS!

When you want any STRUCTURAL WORK it will pay you to write to the

BOSTON BOLT COMPANY
ESTABLISHED 1872

Works, Offices and Salesroom
38-54 Farnsworth Street

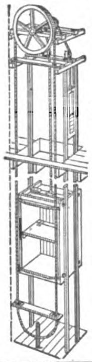
Convertors of Iron and Steel into Bolts, Expansion Bolts, Nuts, and all kinds of Structural Work for Mills, Churches, Halls, Factories, Bridges, Wharves, Etc., and Iron Work of all kinds forged and made to order. *Send for catalog.*

JOHN W. CROOKS, Treasurer
BOSTON, MASS.

COPPER LIGHTNING RODS

ABSOLUTE PROTECTION from LIGHTNING is given by use of our continuous copper conductors.

E. G. Washburne & Co., 46 Cortlandt St., New York.
Telephone 3125 Cortlandt.
Work put up or material furnished.



DUMB WAITERS AND HAND ELEVATORS

- Trunk Lifts,
- Invalid Lifts,
- Carriage Elevators,
- Freight Elevators,
- Sidewalk Elevators
- Hatchway Hoists

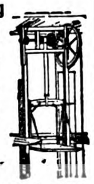
All of most improved design and construction.

Sedgwick Machine Wks.,
88 Carroll Street,
POUGHKEEPSIE, N. Y.
New York Salesroom, 128 Liberty St

Catalogue on application.
Estimates on request.

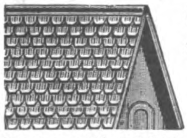
Improved Quick and Easy Rising Steam, Electric and Hand Power Safety

ELEVATORS



AND DUMB WAITERS.
Automatic Hatch Gates.
Send for Circulars.

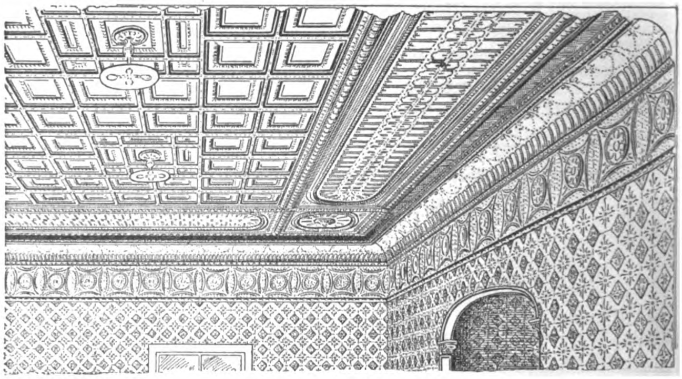
KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kimball Elevator Co., Cleveland, Ohio, 245 Vincent St
Branch Offices:
120 Cedar St., New York. 108 11th St., Omaha, Neb



Carpenters

Do you want work laying Montross Metal Shingles? If so—
Write to-day to

Montross Metal Shingle Co., CAMDEN, N. J.



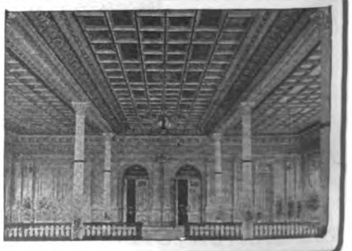
THE KINNEAR

LOCK-JOINT STEEL CEILING, Etc.

Has no equal. Try it and be convinced. Prices reasonable.
Catalog upon request. Send measurements for estimate.

The Kinnear & Gager Co., M'f'r's, COLUMBUS, OHIO
BOSTON, 125 Broad St.

We make Ceilings for churches, schools, stores, lodge rooms, court rooms, libraries, residences, etc.



Our ceilings are shipped ready for erection. No expert labor required. Working drawings furnished. They're adapted to any kind of building. Exclusive in classified design.

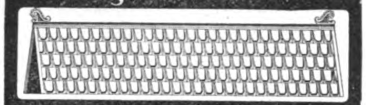
Berger "CLASSIK"

Steel Ceilings

We also make Steel Roofing, Siding, Metal Shingles, Architectural Sheet Metal Work and Fireproofing Material.

Our catalogues sent you free. Ask for them.

THE BERGER MFG. CO.
CANTON, OHIO.
New York. Boston. Phila. St. Louis.




DIAMOND
EXPANSION SHIELD


F. A. SACKMANN.
61 PROSPECT ST.
CLEVELAND, OHIO.
OHIO

LOOK OVER THE SIMONDS SAWS, and you will see the points of advantage.

FIRSTLY, they are ground a true taper, which enables the user to run the Saw with very little Set.

SECONDLY, each Simonds Saw is handled by a mechanic who thoroughly understands the hanging of the Saw, which guarantees this most important feature.

THIRDLY, the filing and setting of the Simonds Saws are carefully done, and thoroughly inspected, so that the Saws, on leaving the factory, are ready for work.

FOURTHLY, the steel used in the manufacture of the Simonds Saws is a high carbon crucible steel, and will hold its cutting edge much longer than the ordinary steel generally used.

FIFTHLY, each Saw is put up in a separate case, thus avoiding fingering and rust marks commonly found on Saws that are not encased properly

SIXTHLY, because every Simonds Saw is guaranteed thoroughly.

Any mechanic trying a Simonds Saw, and not finding same satisfactory, may return the Saw, either to the dealer or to the Simonds Mfg Co., and get either a new Saw or money paid back.

SEND FOR CATALOGUE AND PRICE LIST.

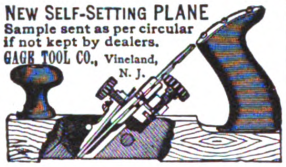
SIMONDS MFG. CO.,

Fitchburg, Mass. Chicago, Ill. New York, N.Y.
Portland, Ore. Seattle, Wash.
SIMONDS MFG. CO., Ltd., New Orleans, La.
SIMONDS SAW CO., San Francisco, Cal.

STANDARD MINERAL WOOL

LOOKING ALL WAYS FOR BUSINESS

COLUMBIA MINERAL WOOL CO.,
Room 918, 112 Clark St. CHICAGO.
Samples and Circulars Free



NEW SELF-SETTING PLANE
Sample sent as per circular if not kept by dealers.
GAGE TOOL CO., Vineland, N. J.

Irons warranted. Plane is returned money refunded.

Bolcoa
TRADE MARK
ETCHING FLUID

Marks your tools in a manner impossible to erase without destroying article itself. Price 25 cents.

A FULL LINE OF
CARPENTERS' TOOLS
Let Us Know Your Wants

Reed & Auerbacher Co.
229 Bowery, N. Y.

All Manner of Handy Rules for the Estimator are given in . . .

HODGSON'S
Estimating Frame and Brick Houses

ONE DOLLAR, POSTPAID.

DAVID WILLIAMS CO., 14-16 Park place, N. Y.

Fireplace Mantels
MADE OF
Ornamental Brick
$12 and up.

Last longest—look best—are not too costly. There's no other kind so good—so pleasing. Our Sketch Book tells all about them. Write for it.

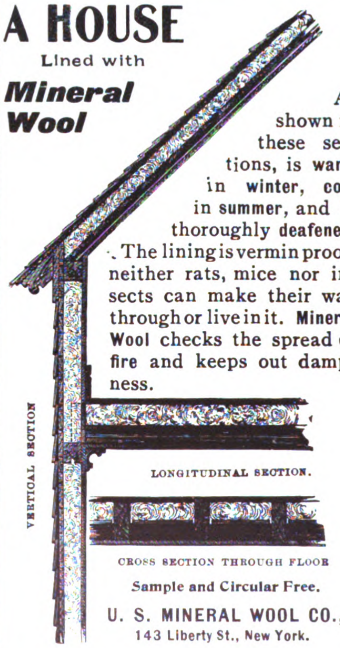
PHILA. & BOSTON FACE BRICK CO. - P. O. Box 8613 - BOSTON, MASS.

OUR FINE HARDWOOD FLOORING
SHOULD BE THE BEST.

We have been making PARQUETRY for TWENTY YEARS. We have our own saw mill and timber tracts and two factories. Send for our trade discounts and our Design Book No. 5.

WOOD-MOSAIC FLOORING CO.
ROCHESTER, N. Y. NEW ALBANY, IND.

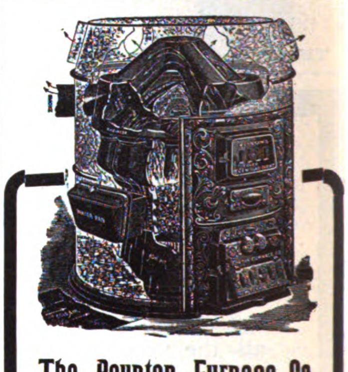
A HOUSE
Lined with
Mineral Wool



As shown in these sections, is warm in winter, cool in summer, and is thoroughly deafened. The lining is vermin proof; neither rats, mice nor insects can make their way through or live in it. Mineral Wool checks the spread of fire and keeps out dampness.

Sample and Circular Free.

U. S. MINERAL WOOL CO.,
143 Liberty St., New York.



The Boynton Furnace Co.

SOLE MFRS. OF

Boynton's Furnaces,
Ranges,
Hot Water Heaters,
Steam Heaters, Etc.

207-9 Water Street, New York.
147-9 Lake Street, Chicago.

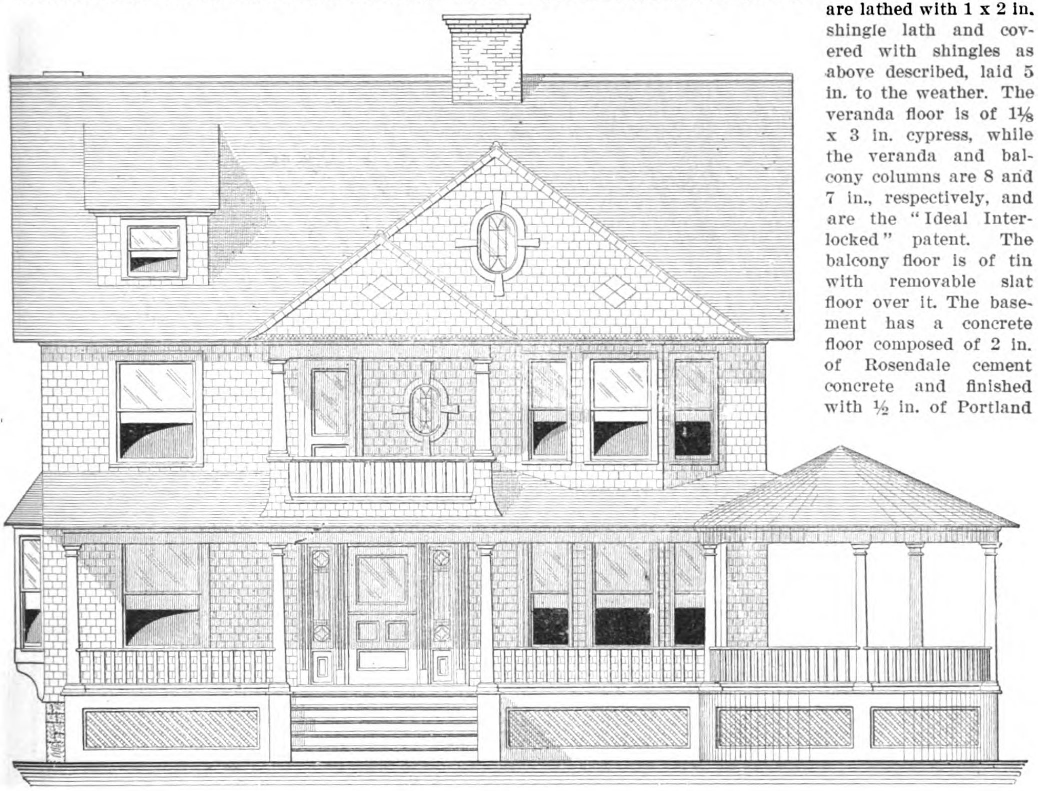
EVERY Builder who reads, investigates and progresses will have a copy of Kidder's Strength of Beams, Floors and Roofs. $2.00 prepaid.
DAVID WILLIAMS CO., 14-16 Park Place, N. Y.

Carpentry and Building

NEW YORK, DECEMBER, 1906.

Frame Residence at Riverhead, Long Island, N. Y.

WE present for the consideration of our readers the drawings of a two-story frame residence with shingled exterior, broad veranda extending across the front and partially around one side of the building, and balcony over the front entrance in combination with the interior arrangement which will meet the requirements of many. One of the striking features is a broad deep hall with the main flights of stairs rising from near the center of the building, thus affording opportunity for throwing the two front rooms and hall into a suite extending entirely across the front of the house. The general treatment and arrangement are such as to render the design here presented of suggestive value to builders and prospective home seekers. The half-tone supplemental plates which are direct reproductions from photographs taken especially for *Carpentry and Building*, give an excellent idea of the appearance of the finished structure as well as of the arrangement of the main stairs and the immediate approach in the reception hall.



Front Elevation.—Scale, ⅛ In. to the Foot.

Frame Residence at Riverhead, N. Y.—Edwin H. Blume, Architect.

According to the specifications of the architect, the foundation walls are of Connecticut River bluestone, laid in cement mortar and blocked off with lime putty with rule joint above grade. The house is balloon frame with sills 3 x 8 in.; girders, 6 x 8 in. First, second and attic floor beams, 2 x 8 in., placed 16 in. on centers. Rafters 2 x 6 in., placed 20 in. on centers. Corner posts 2 x 4 in. doubled and backed up each way with 2 x 4 in. Ribbon strip 1 x 6 in. Georgia pine; studding 2 x 4 in., spaced 16 in. on centers, window and door studs doubled to header, the header being 4 x 6 in. Fire stops of 2 x 4 in. are cut in between studs at each floor level. All timber is spruce, except the ribbon strips.

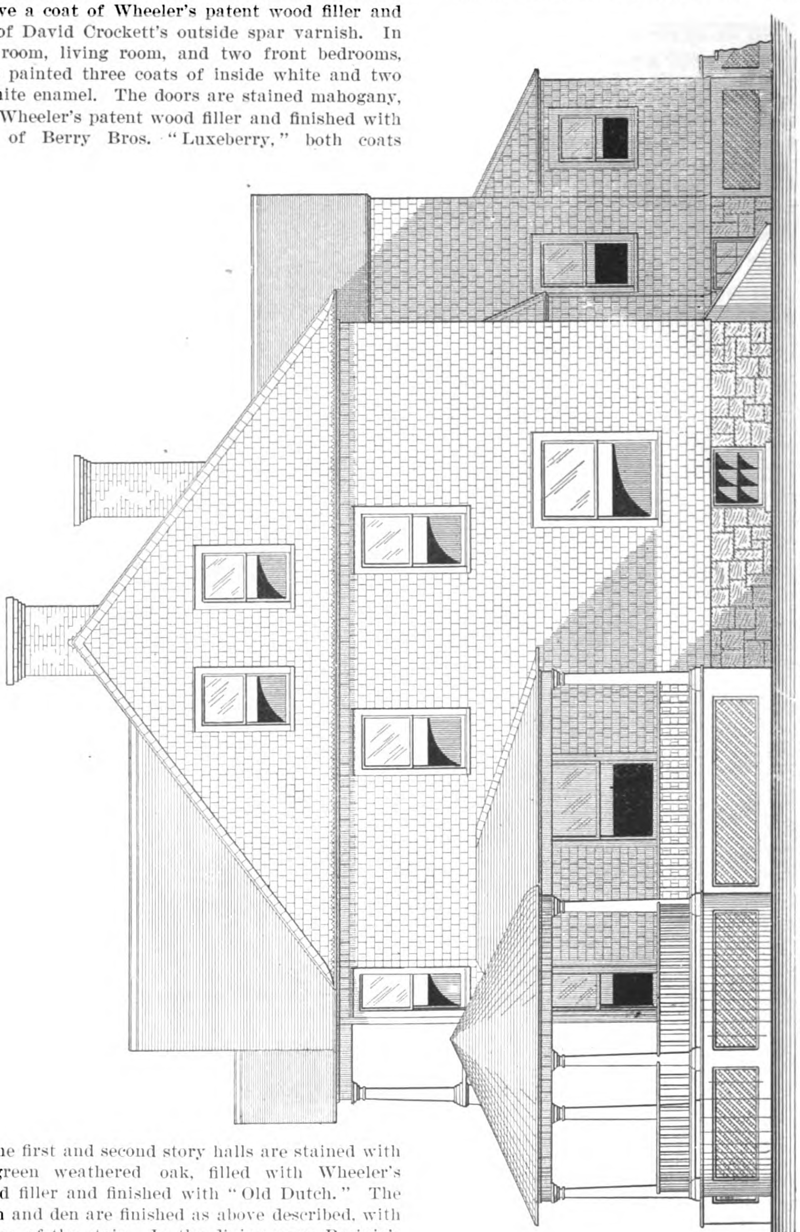
The entire sides and ends of the building are sheathed with ⅞ x 8 in. tongue and grooved North Carolina pine, over which is laid red, rosin-sized sheathing paper, well lapped. This in turn is covered with 6 x 18 in. sawed cypress shingles, laid 5½ in. to the weather. The rafters are lathed with 1 x 2 in. shingle lath and covered with shingles as above described, laid 5 in. to the weather. The veranda floor is of 1⅛ x 3 in. cypress, while the veranda and balcony columns are 8 and 7 in., respectively, and are the "Ideal Interlocked" patent. The balcony floor is of tin with removable slat floor over it. The basement has a concrete floor composed of 2 in. of Rosendale cement concrete and finished with ½ in. of Portland cement. The outside cellar steps are bluestone.

The walls and ceilings of the first and second stories are lathed and plastered with King's Windsor cement, rough sand finish, except the bathroom, which is finished 4 ft. in hight with Keene's cement, blocked off in 3 x 5 in. rectangles. Above the walls are smooth hard finish. All walls, excepting bathroom, kitchen, pantries and servant's room, are tinted, "Calcimo" being used.

The floor beams in first and second-story floors, excepting bathroom, are covered with ⅞ x 8 in. tongue and grooved North Carolina pine, with paper over them and finished with ⅞ x 2¼-in. tongue and grooved North Carolina pine comb grain. The bathroom finished floor is ⅞ x 2¼ in. maple, and the attic floor ⅞ x 8 in. North Carolina pine. All trim throughout is cypress. The dining room and den are finished 5 ft. in hight with burlap, divided into panels with ¼ x 1½ in. battens.

Above this is placed the plate rail, supported on brackets. Above the plate rail in the den are diagonal battens placed directly on the wall, as shown by the details. The ceiling is also finished with battens spaced 16 in. on centers. The burlap in the dining room is red, and the den, tobacco colored. The kitchen and pantries are finished 3 ft. in hight with ¾ x 2½ in. V-joint cypress sheathing with neat cap on top.

All exterior trim is painted three good coats of white paint, with the exception of the blinds, lattice and veranda floors, which are buff. The veranda and balcony ceilings have a coat of Wheeler's patent wood filler and two coats of David Crockett's outside spar varnish. In the music room, living room, and two front bedrooms, the trim is painted three coats of inside white and two coats of white enamel. The doors are stained mahogany, filled with Wheeler's patent wood filler and finished with two coats of Berry Bros. "Luxeberry," both coats rubbed. The first and second story halls are stained with Breinig's green weathered oak, filled with Wheeler's patent wood filler and finished with "Old Dutch." The dining room and den are finished as above described, with the exception of the stain. In the dining room Breinig's flemish oak stain is used and in the den an ebony stain is substituted. The bathroom woodwork and imitation tile is finished with three coats of inside white and two coats of enamel. The balance of the house is stained, filled and hard-oiled, Berry Bros. "Luxeberry" being used, two coats over the stain and both coats rubbed. All floors except in attic, are filled and two coats of "Surpremis" applied.



Frame Residence at Riverhead, N. Y.—Side (Right) Elevation.—Scale, ⅛ In. to the Foot.

In the kitchen is a speaking tube connected with second-story bay window room, as is an electric bell connected with a push button at the front door. The house is completely wired and generously supplied with switches for electric lighting, as shown by the floor plans.

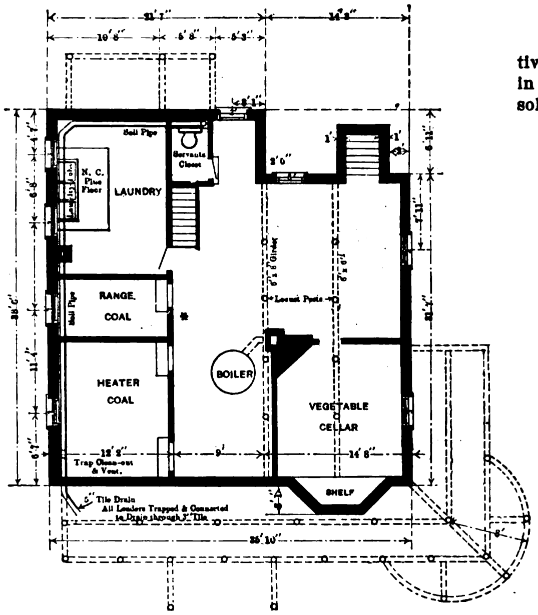
The plumbing in the bathroom consists of a 5 ft.-6-in. "Occident" enameled iron tub and No. 1 portable nickel-plated shower, a 20 x 26 in. Lenox lavatory and a Lenox water closet. There is a Yale corner lavatory in each of the front bedrooms, as shown. All exposed piping in connection with the fixtures, are nickel-plated and all the above are the Standard Sanitary Manufacturing Company's make.

In the kitchen is a 20 x 36 x 6 in. enameled iron sink and a 40-gal. range boiler. In the basement is a Kolo closet, manufactured by the Fred Adee Company, and a three-part Alberene Laundry set.

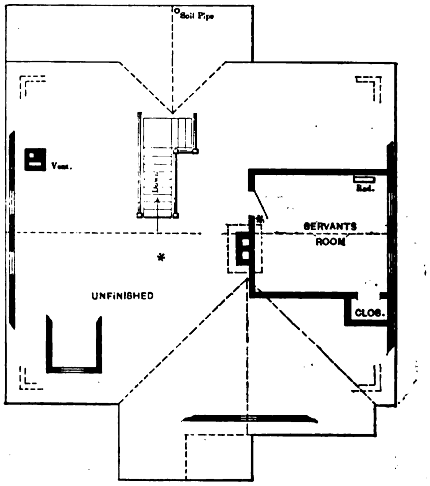
The building is heated with one of the American Radiator Company's "Argo" steam boilers and a one-pipe steam system is employed, with radiators situated where shown on the floor plans. All cellar pipes are covered with H. W. Johns sectional covering and the boiler with 1 in. of plastic asbestos cement.

The house was recently erected on East Main street,

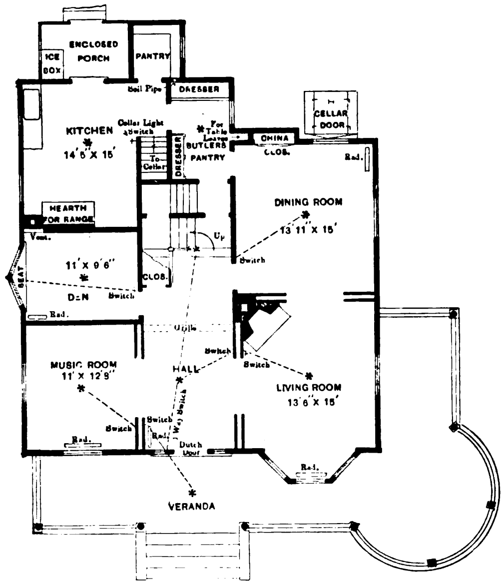
Riverhead, Long Island, N. Y., for B. Frank Howell, Jr., in accordance with plans prepared by and under the supervision of Edwin H. Blume, architect, Riverhead, Long Island, N. Y. William H. Camerden, Quogue, Long Island, N. Y., was the contractor for the building, while the plumbing and heating was executed by J. Irving Edwards, Riverhead, Long Island, N. Y., under separate contract.



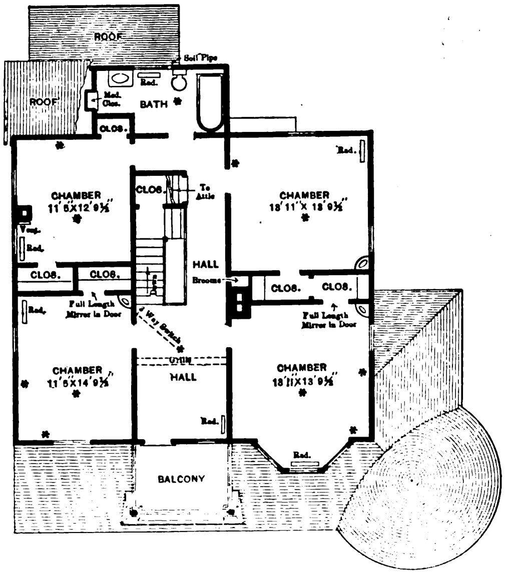
Foundation.



Attic with Outline of Roof Plan.



First Floor.



Second Floor.

Frame Residence at Riverhead, N. Y.—Floor Plans.—Scale, 1-16 *In. to the Foot.*

◆◆◆

AN elevator apartment house, which will be erected on upper Seventh avenue, New York City, will possess the distinction of being the tallest apartment house in that particular section of Manhattan. It will occupy a corner site, will be nine stories in hight and will have three fronts in light brick, terra cotta and limestone. The equipment in the interior will be of the latest and most approved methods, including two electric elevators, electric dumbwaiters, refrigerating plant, steam heat, &c. It is estimated to cost about $250,000, and the plans are being prepared by Maxmillian Zitkes, 147 Fourth avenue, New York City.

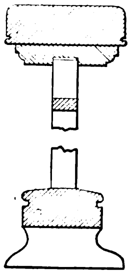
◆◆◆

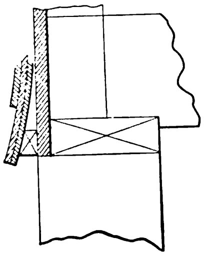
Constructing Show Windows to Prevent Frosting.

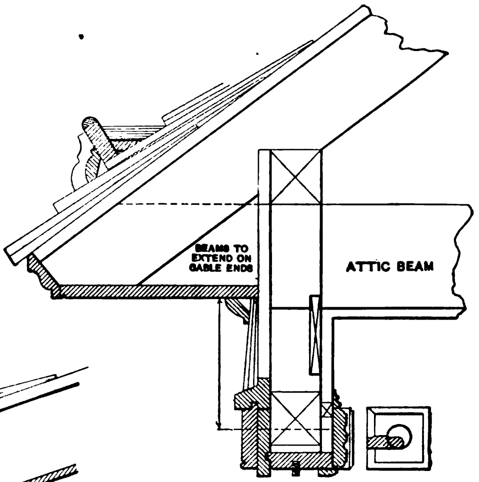
More or less has appeared in the technical press relative to means of preventing show windows from frosting in winter, and mechanics who have been called upon to solve the problem have often been put to their wits' ends to devise means for overcoming the annoyance to which shopkeepers are subjected through the frost covering their windows to such an extent as to prevent the goods within being properly displayed. In taking up the subject of the proper method of constructing the show windows a writer in the *Decorators' Gazette* points out that a careful examination of the construction of the wooden casing, the position of the window panes or the lack of adequate ventilation, is the secret of the trouble. For the purpose of studying the question show windows may be divided into two classes—those inclosed at the back and those that are open toward the store. The former is

the one more afflicted with mist and frost, and it is this class with which the present article will deal.

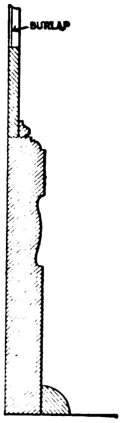
In putting in the window panes, whether the framing be of wood or iron, a row of ventilating holes should be provided below, extending all across the window front. These holes should be broad and set low down, but not covered with protecting covers on the outside, since these covers only catch dust and help to stop the draft. The idea is to cause a wide current of air to enter the window, so that the same may spread over the whole front of the window, and this is more easily realized with wide holes than by round ones or vertical slits. To prevent an inrush of dust raised by the street traffic or blown about in the summer time a sliding damper may be arranged inside the windows, so that the holes may be closed when required.


Detail of Porch Balusters. —Scale, 1½ In. to the Foot

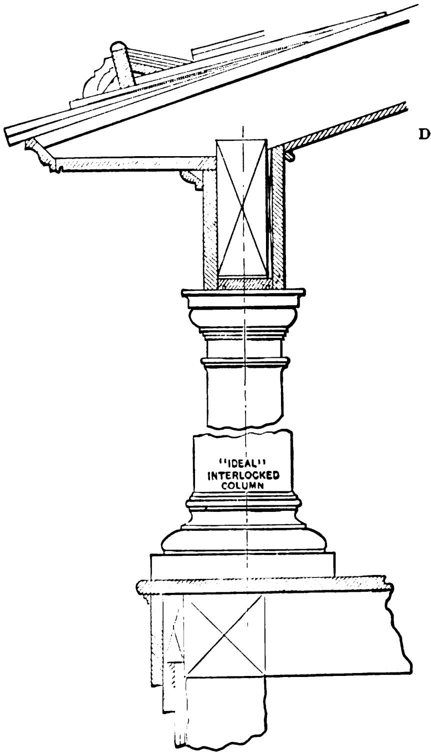

Detail of Belt Course.—Scale, 1 In. to the Foot.



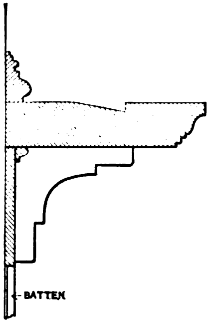
Detail of Main Cornice.—Scale, 1 In. to the Foot.



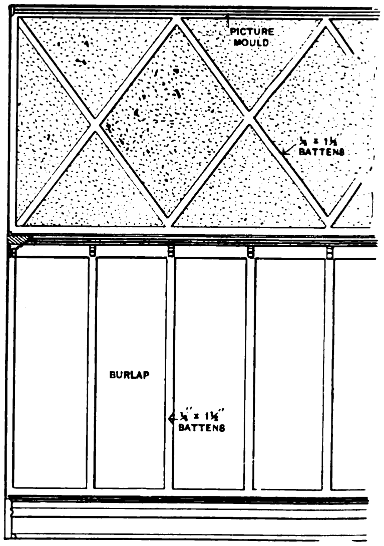
Section of Base. —Scale, 3 In. to the Foot.



Detail of Veranda Cornice and Column.—Scale, 1 In. to the Foot.



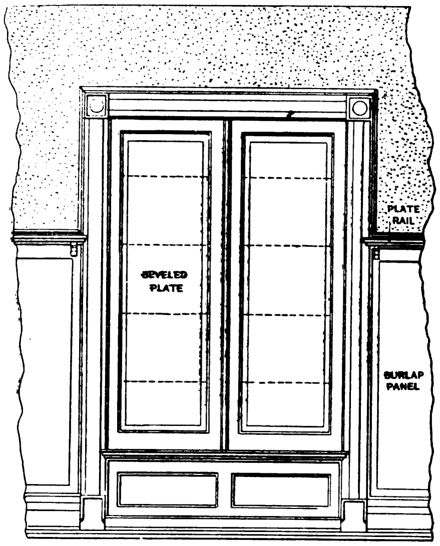
Detail of Plate Rail and Battens.—Scale, 3 In. to the Foot.



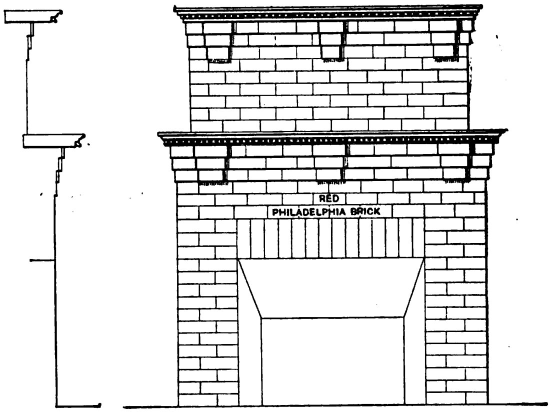
Finish in Den.—Scale, ⅜ In. to the Foot.

Miscellaneous Constructive Details of Frame Residence at Riverhead, N. Y.

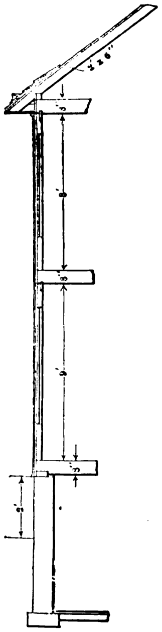
Above the level of the window panes, but still within the casing of the show window, should be provided hinged ventilators to allow the heated air in the window to escape out into the street. For this purpose a row of holes similar to those underneath the window would be insufficient, owing to the increased volume occupied by the heated air, and on this account the upper opening must be of larger area, in order that the circulation of air inside the window may be intensified. This hinged ventilator must be mounted right at the top of the shop front and open inward and upward, since otherwise it would oppose an undesirable resistance to the outflow of air or divert it, and thus lead to a deposit of mist on the upper part of the window. Furthermore, the inlet holes must be surmounted by a ledge or beading that can deflect the flow of air and allow ice to form. It is an equally erroneous practice to extend the flooring of the show casing right up to the window, and bore a number of inlet holes through the flooring. In order to keep the glass free from frost the inflowing cold air must ascend close to the window panes and escape at the top without hindrance. When this is possible the window will never be dimmed with either mist or frost, since the moisture that would be deposited on the glass is carried away by the ascending current of air the instant the particles of water are formed.



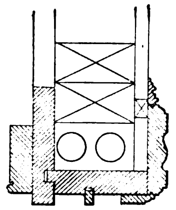
China Closet and Dining Room Finish.—Scale, ⅜ In. to the Foot.



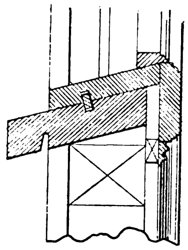
Elevation and Profile of Mantel in Living Room.—Scale, ⅜ In. to the Foot.



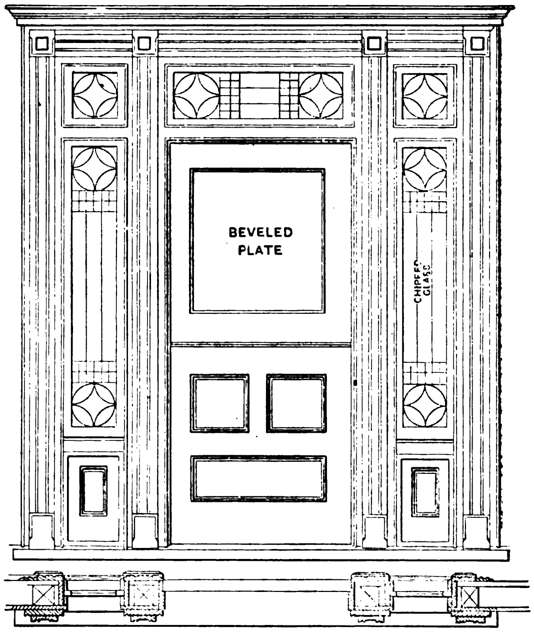
Section.—Scale, ⅛ In. to the Foot.



Horizontal Section through Window Frame. — Scale, 1½ In. to the Foot.



Section through Window Sill.—Scale, 1½ In. to the Foot.



Elevation and Plan of Front Door and Frame.—Scale, ⅜ In. to the Foot.

Miscellaneous Constructive Details of Frame Residence at Riverhead, N. Y.

In some cases it happens that although the ventilation is believed to be satisfactory the glass gets dimmed; but this is due to defective construction of the window frames or of the casing. For instance, if the door leading into the show window from the store does not shut quite tight, or there are any cracks or holes in the woodwork, the warm, moisture laden air from the store flows into the cooler window, and a fine dew is deposited on the panes and mirrors. Hence the doors should never be of the sliding type, these admitting air and dust, but should open and shut, and be beaded and fitted into a rabbeted frame to make them airtight.

The window lights should be inclosed in glass cases to isolate them from the actual show space, because in the case of gas the lights would heat the air more rapidly than the ventilator could carry it away, the result being a deposit of moisture on the relatively cold window pane. To prevent this the light should be isolated by a glass partition, the compartment thus formed communicating with the store by means of a hinged ventilator or else left quite open at the back. Electric lamps do not give out so much heat as gas and may be installed within the show window when proper ventilation is provided for the latter. A row of small gas jets extending right across the bottom of the window is of no use. On the one hand it heats the air to such an extent that the glass will be covered with mist immediately the gas is turned off, and, on the other hand, is likely to crack the glass by unequal contraction.

Mist and frost in badly arranged windows are particularly noticeable early in the morning as soon as the store is opened, the outside of the windows having been cooled down by night air. In such cases the mist or ice takes such a long while to thaw off that the best time for business has passed. Here, however, a remedy can be provided in the shape of a small electric fan mounted at the back of the window, with its vanes parallel to the front glass.

REINFORCED CONCRETE IN GREENHOUSE CONSTRUCTION.

By William McDonald.

The rediscovery of cement is quite recent, and while it has been used extensively in engineering and architectural work, both of which terms are fast becoming synonymous, yet cement in the form of concrete has only received its greatest impetus since the application of various forms of steel rods and expanded metal as reinforced materials. This application is possible on account of the expansion of both materials being nearly equal, while the steel supplies the great tensile strength which the concrete lacks. It has been successfully applied to greenhouse construction, both in hollow concrete blocks and also in monolithic form. It is, however, the latter application which is here illustrated, as it is only in this way that the reinforcing can be applied. There is no doubt that the general application of concrete in the future will be in the monolithic form, for the reason above stated. The only objection in greenhouse work is the dampness, which keeps the houses cold in the winter; but this is obviated in a degree by using a damp course of coal tar ½ in. thick just above the level of the ground.

The best applications of reinforced concrete is to graperies, the construction of which is indicated in Fig. 1 of the illustrations. These having to be supported on pillars so that there may be room for the roots of the vines both outside and inside, large spans are used as indicated in the engraving, these being represented 8 ft. in the clear. The wall is 18 in. high and 12 in. thick, reinforced with 1 per cent. of steel per volume, equal to eight ½-in. rods or four ¾-in. rods. The wall then really becomes a beam with 8 ft. span. For the rear wall a section 18 in. wide at the bottom and 12 in. at the top is adopted with rough concrete footing. The molds for this are formed of 4 x 4-in. timbers placed 12 ft. on centers and joined by cleats and bolts so as to give an accurate cross section of wall. These are to be braced as indicated in Fig. 2 until the first course of concrete is placed. The mold board, an elevation of which is shown in Fig. 3, is 4 x 12 ft. and constructed of ¾-in. boards planed on the inside and with cleats to bolt them to the uprights. Each time before they are used the molds should be well oiled on the outside with dead oil.

The concrete should be composed of one part cement to two parts of clean, sharp sand and four of small broken stone. The mixing is very important and as a general thing is not properly done. The sand for a batch should be spread evenly on the mixing board and covered uniformly with the cement, after which they should be turned over twice while dry. The stone and the water should then be added, care being taken to wet the stones thoroughly; in fact, it is a good plan to wet them before hand. The mixing is then completed and the concrete shoveled into the mold and lightly tamped.

For the tables indicated in Fig. 4 gravel is substituted for the broken stone and the proportions are 1 part cement, 2 parts sand and 3 parts gravel. In constructing the tables place a footing of concrete about 9 x 9 in. and 9 in. deep under each iron pipe support, making sure that the pipe is firmly bedded in the concrete. It is also essential that the tops of the pipe supports be bedded in the concrete tables. Now place the mold in position with the supports under them as indicated in Fig. 5. As a table also forms a beam, the reinforcing rods are placed the length of the table, using for the purpose ½-in. square steel rods. The material is mixed as before and placed in position, a smooth skin being worked up on top of the table. The position of the mold for the rounded end is made to unscrew from the general mold. The upright rod embedded in the concrete is all that is necessary for the support of the tables.

The above are simply examples of the application of this method of reinforced concrete construction, and the great advantage of it is that any small contractor with sufficient care can make a very satisfactory job. The same construction can also be applied to the walls and floor of the stoke hole to form pipe supports or for potting sheds, toolhouses, gardners' cottages, &c.

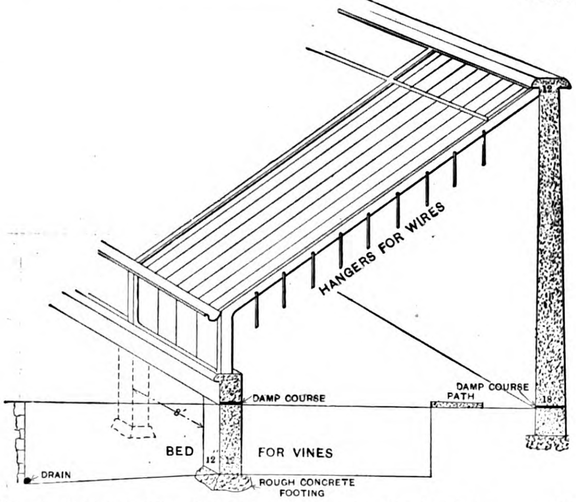


Fig. 1.—Isometric View Indicating Construction, Spacing for a Grapery.

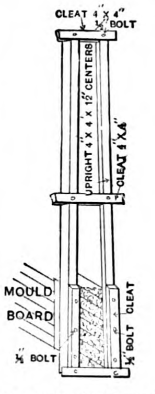


Fig. 2.—Cross Section of Mold, &c.

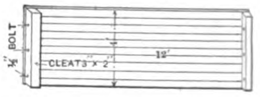


Fig. 3.—Elevation of Mold Board.

Reinforced Concrete in Greenhouse Construction.

Preliminary Work for Concrete Buildings.

For some time past a striking feature of the building operation in progress on the block bounded by Seventh and Eighth avenues and Thirty-ninth and Fortieth streets, New York City, was a crib-like wooden tower 32 ft. square and rising to a hight of 147 ft. This was located in the middle of the plot, on which will be erected the new 12-story reinforced concrete structure of the McGraw Publishing Company, and designed by Architects Radcliffe & Kelly. In viewing the operations preliminary to the concrete work the visitor could not fail to have been impressed by the vast amount of lumber that must be put in position, only to be taken down again when the building is finished. What the contractor is obliged to do is practically to erect an entire frame structure with an outer and an inner shell, fill in the space between the two with concrete and then, when the material has "set," take the framework down again. In speaking recently of this phase of the work the superintendent for Frank B. Gilbreth, who has the contract for the construction of the building, said:

"Economy in the handling of materials is the most important feature of concrete building construction. Take that tower there for example. It rests on concrete piers carried down 6 ft. into the rock and prob-

ably contains enough lumber to build a row of small frame houses—a pretty substantial bit of construction just as a preliminary—but from its four corners 75-ft. derrick beams will swing, having within their reach every square foot of this whole plot. We also plan to rig intermediate booms on the four sides of the tower, so that the work of placing the concrete in position can be carried forward at a very rapid rate. With the foundations finished and the structure once above the street level, we expect to finish an entire story over the whole of the building's area every four days.

"With the increasing use of concrete in building construction have come improvements in the concrete mixing machines. The latest of these, of which we have three here on this work, is almost wholly automatic in its operation. The materials are dumped into a sort of hopper, which, at the pressing of a lever, moves up an incline and deposits its contents in the mixer. Six revolutions and out comes your batch of several yards of concrete all ready for use.

"The concrete building in course of construction is different from the steel skyscraper in one important particular. In the steel skeleton building the framework always rises ahead of the outer walls. In the concrete building just the reverse order of things must prevail. Men employed on the walls in this structure will work two stories ahead of those on the columns and floors, so that the reinforcements can be placed into the solid pilasters of the outside walls.

"Another point to be remembered wherein concrete construction differs from the steel skeleton method, is that in the latter a floor, or even an additional tier of beams, once in position, can be used immediately as a point of vantage from which to carry the building higher. In concrete work, of course, this cannot be done. The concrete columns and floors must be allowed to set for several days before they are subjected to the slightest strain, and it is not until three weeks have elapsed that they attain their full strength. Thus, if the concrete builder figured on using each floor as a stepping stone to the one above he would find himself compelled to indulge in a swift succession of vacations of three weeks each—perhaps a happy arrangement, but one likely to be rather costly. It is in relation to this feature of the work that our tower here is indispensable. Work can proceed without interruption on the successive floors, and without subjecting those already in place to any strain or pressure until they have set thoroughly.

"Samples of the concrete used in a building of this kind are taken at frequent intervals as the work progresses and are molded into bricks 4 x 4 x 8 in. These are tested to make sure that at every point the artificial stone will be of the necessary strength to stand any strain that may be put upon it. The strength of properly constructed floors of reinforced concrete may be judged from the facts brought out in fire tests. After being subjected to a wood fire for four or five hours—heated red hot—and then suddenly cooled, they have shown no serious defects and have withstood pressure of 600 lb. to the square foot, as against the standard requirement of 180 lb.

"Concrete shows strange characteristics under various conditions. It is a curious fact that while it is setting concrete seems to deteriorate somewhat through exposure to the sun. You will find that the makers of cement blocks are much more anxious to keep them in the shade until they have set than they are to keep them out of the rain. Indeed, concrete seems to thrive in water. I have kept under water for a year blocks made of 1 part cement, 1 part sand and 2 parts broken stone, and at the end of that time they were as tough as granite. In the construction of buildings the concrete is of course protected from the sun's rays to a large extent by the wooden molds, which are not removed for some time."

The work of building the retaining wall around the new building is now in progress and gives a very fair idea of how the reinforced concrete construction is handled. First, the outer mold, or back slab, as it is called, is placed in position and its inner side waterproofed up to grade. Next, the reinforcements, consisting of steel rods ⅞ in. in diameter, are placed in position—those which extend vertically being only 3½ in. apart, while the horizontal ones are 2 ft. apart. At every point where a vertical rod crosses a horizontal one the two are wired together. Then the inner molds or panels are erected and strongly braced to prevent spreading, after which the space is filled with concrete and carefully tamped so that the reinforcing rods are equidistant from the two faces of the wall. The bracing of the molds is a part of the work which has to be looked after most carefully, for if this is not done the boards will spread and produce wholly unsatisfactory results.

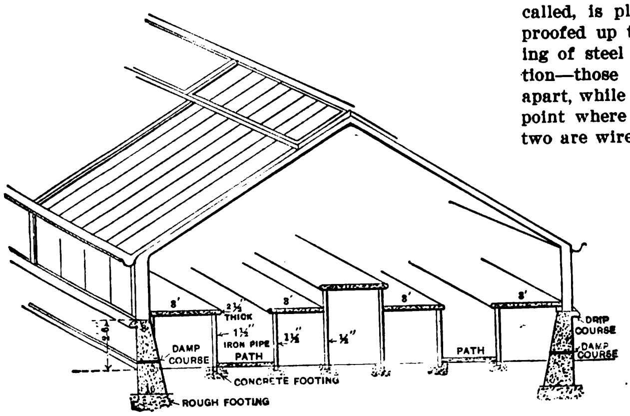


Fig. 4.—An Isometric View Showing Position of Tables, &c.

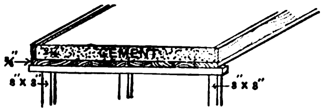


Fig. 5.—Cross Section of Mold Board for Tables.

Reinforced Concrete in Greenhouse Construction.

The Rights of Labor Unions.

The Supreme Court of Massachusetts has handed down an interesting decision affecting the rights of labor unions in that it defines the illegality of a certain form of sympathetic strike. The case is that of Picket *et al. vs.* the Bricklayers' Benevolent and Protective Union No. 3 *et al.*, in which the plaintiffs are nonunion stone pointers who were hired by the owner of the building upon which the defendants were employed by a contractor. The defendants called a strike on several buildings for which their employer, the L. P. Soule & Son Company, had the contracts, because the owners of one of these buildings, the Ford Building, Boston, refused to discharge the nonunion stone pointers who were employed by him and not by the contractor. Other more familiar issues were involved. The court states in its decision: "That strike has an element in it like in a sympathetic strike, in a boycott and in a blacklisting—namely, it is a refusal to work for A, with whom the strikers have no dispute, because A works for B, with whom the strikers have a dispute, for the purpose of forcing A to force B to yield to the strikers' demands. . . . Such a strike is not a justifiable interference with the right of the plaintiffs to pursue their calling as they think best. In our opinion organized labor's right of coercion and compulsion is limited to persons with whom the organization has a trade dispute; or to put it in another way, we are of opinion that a strike on A, with whom the striker has no trade dispute, to compel A to force B to yield to the strikers' demands, is an unjustifiable interference with the right of A to pursue his calling as he thinks best."

A SQUARE DEAL IN ROOFING PLATES.

THE builder, contractor and tin roofer now have the opportunity of buying just what they want and of knowing just what they are getting when they buy roofing plates. Their demands have been urgently presented for a change which would give them this information correctly. All of the old confusion as to quality and grade has been swept away by a notable departure which is a long step in the right direction. It is what President Roosevelt might term "a square deal in roofing plates." The American Sheet & Tin Plate Company has arranged to stamp on each sheet of terne plate it manufactures, not only the brand, as has heretofore been done, but also, and vastly more important, the number of pounds of coating which it carries. The buyer of roofing plates is to be still further protected, as the company will stamp on all waster plates the word "waster" in letters ⅝ in. high. This very important step has been announced to jobbers, and is favored by all the leading jobbers to the extent that they have ordered the company to stamp on all their private brands the number of pounds of coating which they carry. Beyond question this is more than the roofers, who have been conferring with the manufacturers for almost a year, expected could be accomplished in so short a time.

These newly stamped plates will probably make their appearance on the market about the first of the year. In addition to stamping the plates, the company announces that a much closer inspection of the sheets turned out is being made than heretofore, all tending to secure to the buyer sheets so coated as to stand successfully both the exposure to weather and the ravages of time and service. The reduction in the number of grades which has been requested is not open to the same positive treatment, but when all roofing plates carry a stamp with the number of pounds of coating on them all who are interested to know the grade they are getting and the opportunity for substitution with all its pernicious effect is destroyed. The stamping of the plates in a large measure disposes of the question or satisfies the desire for a reduction in the number of grades, and yet allows a freedom to the buyer which is essential to meet the requirements of some customers. That the difference in cost of roofing plates is in a large measure due to the weight of the coating they carry can be readily explained to those who do not know it, as can also be explained the increasing advantages of plates carrying the heavier coating.

Important Information Obtainable.

This new stamping of the plates will give important information not only to the tin roofer, but to the architect, the builder and the final owner of any building covered with a tin roof. Many architects have confessed to the confusion, which the variety of brands and claims made for plates brought to them, when the selection of the tin for covering some important building must be made. The builder and the owner of either a new building in course of construction or the property owner has experienced an equal confusion when earnestly seeking for light on the roofing plate question. Under the new method of stamping the conscientious roofer has a fairer chance in competition, and when the plate has been decided upon which is to cover the roof all of his competitors are on an even footing with him. The opportunity of those who were unscrupulous and used a multitude of brands to induce a customer to prompt the substitution of one of lower grade and value for one of higher cost than serviceability has been practically destroyed.

This departure has not been made without some risk of a loss until the loyalty of the tin roofer to the best interests of his business has been tested. This step taken by one manufacturer offers the roofer an opportunity for a choice of both his methods and plates. The roofer should join in the work of acquainting architects, builders and his other customers with the relative value of plates carrying different weights of coating. If the best interests of all concerned in this new enterprise are considered there can be no question that the average price of covering roofs with tin plate throughout the country will substantially advance. This will make it incumbent upon the tin roofer to cultivate that art of selling which induces the customer to purchase that which is sure in the tin roof to give increased service for the increase in price. It is important that the jobbers of tin plate have shown their favor to this positive presentation of the quality on each plate in spite of the fact that it is said the jobbers make the largest profit from their private brands. It is equally true that those who supply tin plate to the roofers have endeavored to meet the demands of their customers for plates of cheaper goods. Now those who want low priced plates can secure them, but in the full knowledge that they do not have the qualifications for satisfactory service which the higher priced plates possess. That there may have been a shuffling of brands to the disadvantage sometimes of the roofer, and frequently to his customer, is probably the cause for some of the discontent with existing conditions which led to a demand for some change for the better. We would counsel the roofer to prepare himself for some lively work before builders and owners are willing to meet conditions fairly. Many will desire to buy a plate with 25 or 30 lb. coating at the same price as a plate carrying but 12 or 15 lb.

Views of Consumers.

Note.—In order to obtain the views with which the plan outlined in the above article was regarded by some of the leading architects, contractors and others, we sent out copies of the above article, requesting an expression of opinion based upon their own experience. Some of the first replies to reach us are presented herewith.

John P. Kingston, architect, Worcester, Mass., writes as follows: "I think there is no question but that the American Sheet and Tin Plate Company are taking a progressive step in stamping or marking plates as outlined, one which all honest architects, builders and tin plate workers will appreciate and will, no doubt, demand their hearty co-operation, as it will also the property owners who care to pay for good materials. As the article states, there is no end to the confusion which the variety of brands and claims made to all who are interested in this as well as many other branches of the building business. This new method will go a long way to lighten the labors of those who have the selection of such materials. It is a well-known fact that we must rely to a certain extent on the honesty and assertions of the salesman in selecting many kinds of materials that we have to use, so that the more simple the means put before us to know that we get what we specify and a good from a poor article, the better it is going to be for all concerned. I think that the views outlined in the article entitled 'Square Deal in Roofing Plates,' sets forth the whole matter in such a clear and simple manner that it is very hard for me to write anything that will improve on it."

Frank M. Hamlin of Hamlin & Sons, contractors and builders, Lake Villa, Ill., says: "It is my opinion that the sheets should also be stamped with the name or trademark of the manufacturer and also the gauge of the iron. This new departure on the part of the manufacturers should have the support of all good architects and contractors as it means a step nearer honest material for good dollars; and when the users of this class of roofing material are assured that they are getting the value of their money, the increase in cost, if any, will be as nothing compared with the satisfaction in knowing that what they have paid for is the best they can get for the money."

The Providence Architectural Metal Works, Providence, R. I., express the following views: "We believe that roofing plates so marked will give at least better plates than they have in the late past and that with the thorough understanding by the architects, builders and owners the merits of the plates will, with the story told by the stamp itself, insure a square deal and place those

who have been in the habit of substituting inferior goods in order to get the business, on a plane where they belong."

Clinton B. Higgins, proprietor of the Trenton Excelsior Cornice Works, Trenton, N. J., says: "I am in favor of stamping the exact weight on every sheet of tin manufactured, also its body, whether charcoal, iron, or steel, with the word 'Guaranteed' in a circle around same, whether I C or I X, all of which should pass inspection or be subject to inspection before being placed on the market. The maker's name need not be on the sheet, but only the box, unless they desire to put it on for advertising purposes. Then and not until then will we have any redress from the conditions which exist to-day. Furthermore, I think the manufacturers who stamp their plates 40 lb. when there is only 30 lb. of tin on them should be liable to a heavy fine and reported to the Master Sheet Metal Workers' Association. Again, the scheme perhaps will have a tendency to bring a better quality of tin into use, as the public will become educated as to what constitutes good tin. They will understand that there is a grade in coating ranging from 10 to 40 lb., and those who want good material will naturally demand 40 lb. coating and the owners especially will examine every sheet on their roofs to see that they get what they pay for. Architects will soon become educated to specify their tin by weight and not name. If they are drawing plans for an expensive dwelling they will specify 40-lb. charcoal iron tin; if for a cheap structure they will use a lighter grade, but in most cases they will specify the best. This in my estimation will give a square deal to one and all, regardless of the manufacturer's name. When the architects specify 'slag roof' they do not mention the kind of paper or black molasses with which they put it on, but that it must be five-ply or four-ply. Now the architect can specify 40-lb. or 30-lb. coating tin stamped on every sheet. I think it a pity that the lamented McKinley, beloved by all and the real founder of the tin plate industry in this country, could not have been a tinker like John Bunyan of old and made a law to the effect that every manufacturer be compelled to stamp the weight and quality on every sheet in the beginning, which would have put the tin plate industry on a higher level than it is to-day and slag roofs would not have been heard of, only in covering barns, factories and sheds."

Growth of the United Brotherhood of Carpenters and Joiners of America.

The fourteenth biennial session of the United Brotherhood of Carpenters and Joiners of America held at Niagara Falls, N. Y., during the two weeks beginning September 17, was regarded by the members of more than ordinary importance, as it marked the twenty-fifth anniversary or silver jubilee of the organization. It was in August, 1881 at a meeting held in Chicago that resulted in the establishment of the present organization. At that meeting 36 delegates were present, representing 11 cities and 12 local unions, with a total membership of 2042. From 1881 to 1900 the union gained 66,421 men and in the decade from 1890 to 1900 the gain was 14,694. In 1905 there were 1759 locals and the membership had increased to 161,217.

According to an article by Wilde Goodwin in the convention number of *The Carpenter*, there were 679 locals in the year 1900, of which 40 were German, 6 French, 2 Bohemian, 2 Jewish, 1 Scandinavian and 1 Latin. In the Southern States there are 16 colored unions in distinctive groups, there being 9 mill men's locals, 6 stair builders' and 1 floor layers'. In 1905 there were 57 cabinetmakers' locals, bench and machine hands included; 9 of stair builders, 6 of parquet floor layers, 6 millwrights, 4 car builders, 4 ship carpenters and joiners and 2 of wharf and bridge workers, making, with the regular locals, a total of 1759, as above stated.

◆◆◆

AMONG the important building improvements which are likely to be made in the near future in Pittsburgh, Pa., is a mammoth hotel, to be located at the northeast corner of Smithfield street and Seventh avenue. Architects MacClure & Spahr have been commissioned to prepare preliminary plans for the structure, which it is stated will cost in the neighborhood of a million and a half dollars, and with the site will involve an outlay of $2,700,000. It is intended to make the new hotel the largest and most up to date hostelry in the city. Henry Phipps, the well-known capitalist, has decided to erect another big power building at Duquesne way and Cecil place, the structure to be of brick, steel and concrete construction and 14 stories in hight. It will have a frontage of 110 ft. on Duquesne way and a depth of 120 ft., and will be devoted to light manufacturing purposes similar to several other buildings owned by Mr. Phipps in that section. The cost is placed at $200,000, and the contract has been awarded to the Pittsburgh Building Company of New York City.

A Concrete Apartment House.

Some interesting features developed in connection with the two six-story elevator apartment houses, the walls of which are made of concrete, and which were completed a few weeks ago in West 137th street, between Riverside Drive and Broadway, New York City. According to the information obtainable, concrete was selected owing to the high price of brick at the time the contractor was about to begin operations. It appears that the plans had been approved by the Bureau of Building, and work was commenced when a delegate from the Bricklayers' Union objected to the concrete men doing the work on the ground that it belonged to the bricklayers. The pay of the concrete men, says the *Record and Guide*, was 30 cents an hour, while the bricklayers received 70 cents per hour. The owner refused the demand of the bricklayers and employed concrete men. After the fifth story had been reached the Tenement House Department ordered the work stopped, as the law said that tenement houses over three stories in hight must be built with brick, together with the staircase inclosure. A compromise was finally reached by building an 8-in. brick wall around the entire staircase inclosure. It is said the walls of concrete have four times the strength of brick, are monolithic and constitute the best fireproof building material known. By the use of concrete every apartment is made absolutely soundproof, so that quiet and privacy are assured.

Home Builders' Exhibition.

A movement has been inaugurated by interested parties to hold what will be known as a Home Builders' Exhibition the coming spring at Madison Square Garden, New York City. This exhibition is intended for the display of everything relating to modern house appliances, landscape, architecture, heating and lighting inventions, road and street building, sewer construction, laying out sites for suburban developments, and all other things bearing on and essential to the real estate industry. It is the general opinion that by an exhibition of this character great interest can be awakened in matters pertaining to the construction of homes which would naturally result in stimulating interest in the buying and building of houses and investments in suburban property. The leading spirit in the enterprise is President Otto Kempner of the Long Island Real Estate Exchange, and after a discussion of the matter by the Board of Governors a committee was appointed to carry the scheme into effect, if such a course upon investigation proved to be desirable.

◆◆◆

AN interesting feature in connection with the new plant, now nearing completion, for the Glidden Varnish Company, Cleveland, Ohio, whose mammoth factory was destroyed by fire a few months ago, is that there is not a stick of wood in the entire structure. It is being built entirely of brick and steel, the latter material being used even for window frames. The walls are of face and pressed brick and the floors of fire brick and cement. The roof is of tile, slate and iron.

KNOTS, HITCHES AND SPLICES FOR THE BUILDING MECHANIC—V.

By Edward H. Crussell.

THE splicing of ropes is generally looked upon by the average mechanic as something beyond his ken, something altogether too difficult to learn. There is really nothing difficult in the working of a splice, although in order to do neat work a certain amount of skillful manipulation is necessary; this, however, can easily be acquired by a little practice.

There are but three splices—the eye splice, short splice and the long splice, though these again have other variations according as to whether they are made in three-stranded, four-stranded or six-stranded rope. Shroud laid rope has four strands, wire rope generally has six, but ordinary hemp rope (hawser laid) has but three, and it is the splicing of a three-stranded hemp rope that we shall in the present article consider. For opening up the strands of the rope some sort of a marlinspike is necessary. The student can easily make this for himself out of a piece of hickory or maple. The splices from which the sketches in this article were copied were worked by means of a marlinspike that was made from an old hammer handle. When splicing very large rope a much larger form of marlinspike, called a fid, is required; also a mallet, with which to drive the fid in between the strands.

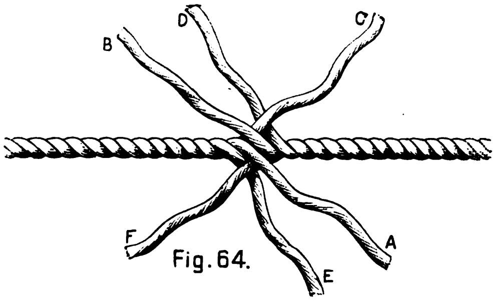


Fig. 64.

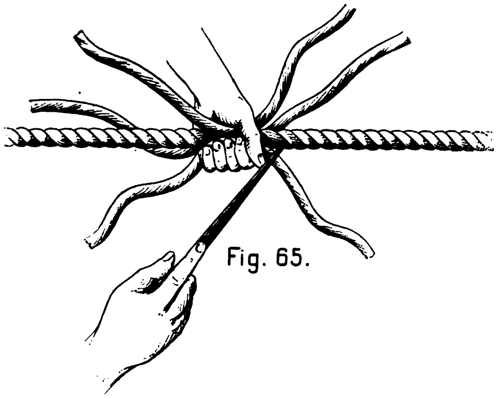


Fig. 65.

Figs. 64 and 65.—Making a Short Splice.

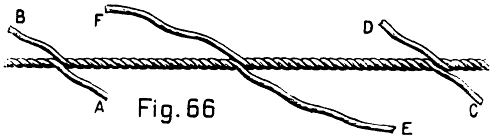


Fig. 66

Fig. 67.

Fig. 66.—Long Splice Partially Completed.
Fig. 67.—A Rope Pointing.

Knots, Hitches and Splices for the Building Mechanic.—V.

The eye splice is the first to be considered. Unlay the end of the rope for a sufficient distance (about six times the diameter of the rope) and form an eye of the size required. Fig. 60 shows the rope and hands in position for working the splice and the direction in which the marlinspike goes through. It is important to remember that the marlinspike always goes through in this direction from right to left. The strands are numbered in the order of working, the numbers being the same in each of the illustrations. The center strand is marked 1 and Fig. 61 shows the first tuck of the splice. Now where strand 1 comes out strand 2 goes in, as shown by Fig. 62, and where strand 2 comes out (on the other side of the rope) strand 3 goes in, as shown by Fig. 63. The third tuck is the most important to remember, that and the direction in which *all* the tucks are made, from right to left, as shown in the illustration. Having proceeded thus far the rest of the splice is easy. The three strands are now equally divided around the rope and each of them goes over one strand and under the strand next to it. The arrow in Fig. 62 shows the second tuck for strand 1, while that in Fig. 63 indicates the second tuck for strand 3, and so on until sufficient tucks have been made. Three tucks are enough for an eye splice.

A tapered splice is made by dividing the strands after the first tuck, and again dividing them after the second. The ends should not be cut off, however, until the splice has had some strain on it. Splices made in rope that is liable to severe strain are better left square. The strands of these splices are sometimes divided after the last tuck, and half of one strand is made fast to half of the strand next to it with a seizing of tar yarn. For instance, half of strand 1 and half of strand 2 are fastened together, the other half of strand 2 and half of strand 3 are next fastened together, and finally the remaining halves of strands 1 and 3 are fastened together. When a splice is finished in this manner the ends are not cut off close.

The short splice is used for uniting two ropes or for joining the two ends of a rope to form a sling. Both ends of the rope must be unlaid for about the same distance as for an eye splice, after which they are crotched or interlocked one with the other, as shown by Fig. 64. The rope and strands on one side of this crotch are next grasped with the left hand, as shown in Fig. 65, and the strands on the other side are worked into the main part of the rope exactly the same as for the finish of an eye splice, passing each strand over one and under the next. After the strands on one side have been tucked twice reverse the splice and treat the other strands in the same manner.

This splice is really easier to learn than the eye splice, there being no difficulty with the third tuck, as the strands after they are interlocked are in the same position as in the eye splice after the first three tucks have been made. The chief difficulty with the short splice is to hold the strands and rope in the left hand tight enough so that the splice shall not be loose, the marlinspike having a tendency to draw the strands from under the left hand rather than to open up the rope. It will perhaps be better for the novice to lash or tie one end of the splice before starting to work it, instead of trusting to his grip alone. This splice may be tapered in the same manner as explained for the eye splice.

The long splice is entirely different from the other two, and is used for joining the ends of a rope where it is desired that the diameter shall not be increased, such as when splicing the ends of a driving rope, or when splicing a rope that is to run through pulley blocks. Both ends of the rope are unlaid for a much greater distance

than for the short splice, the longer the better, but it should be at least 40 times the diameter of the rope. The ends are then interlocked as for the short splice shown in Fig. 64. One of the strands, A, is then still further unlaid, while the strand B is laid up from the other side in the groove from which strand A was taken. Great care must be taken to have the twists of strand B correspond exactly with the twists in the groove from which strand A was taken or a good splice cannot be made. The strand A is unlaid until all but about 6 in. of strand B has been laid up, after which A is cut to the same length as B. Strands C and D are then treated in the same manner, C being the one unlaid and D the one laid up in its place. Fig. 66 shows how the splice will now appear, the strands E and F in the center being the same length as originally. These strands also must be cut to a length of 6 in., after which an overhand knot is tied with them, which must be pulled and hammered down as neatly as possible. Each of the strands is then halved and tucked, as in the finish of the eye splice, over one strand and under the next. They should be tucked twice or three times and halved after each tuck. The ends A, B and C, D are finished off in the same way, after which in order to bring the splice into shape it is rolled on the floor with the foot or with a small piece of board under the foot. The splice should be strained before the ends are cut off. This splice increases the diameter of the rope a little, but not enough to make any material difference. If it is desired to make the splice still smaller the strands may be halved before tying the overhand knot.

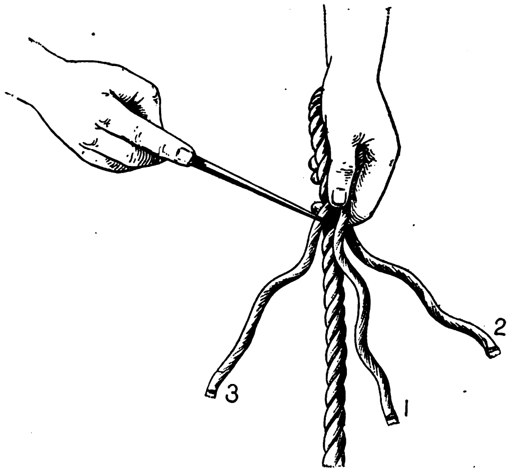


Fig. 60.

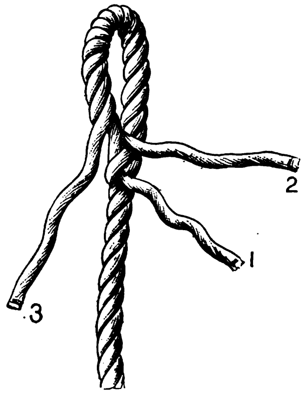


Fig. 61.

Fig. 60.—Shows Rope and Hands in Position for Working the Eye Splice and the Direction in Which the Marlinspike Goes Through.

Fig. 61.—Shows the First Tuck of the Splice.

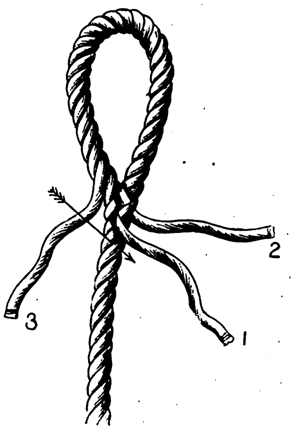


Fig. 62.

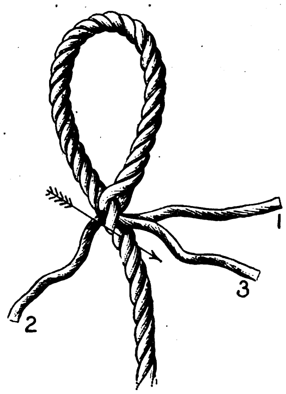


Fig. 63.

Figs. 62 and 63.—Details of the Eye Splice.

Knots, Hitches and Splices for the Building Mechanic.—V.

Fig. 67 shows what is known as a rope pointing. It has been left till last because the writer has thought that it would be an appropriate thing with which to finish off this article. It will pay any man who has to "put up" the money for the ropes to have this pointing worked in all ropes that are over 1¼ in. in diameter, for it not only facilitates the tying of knots or reeving of blocks, but it has a deterrent effect upon the "lunk-head" who is so handy at chopping a couple of feet off the end of a rope to use for tiers.

Very often the whipping or lashing gets off the end of a rope and it is neglected until there is 2 or 3 ft. of the end unraveled. It is almost impossible to lay this up again as small as it was originally, but if some of the yarns are carefully cut out and the others tapered down and then laid up into a rope pointing the unraveled portion instead of being wasted is made to serve a useful purpose. To lay up rope properly is rather a difficult thing for the novice. It is done something in the same manner as explained for making the clove hitch. Hold the rope in the left hand with the end pointing toward you; take hold of the lowest strand with the right hand, give it a twist over to the right and lay it over the two strands held in the left hand. Take the lowest of these two strands and treat in the same manner, and so on until all of the rope is laid up again. Finish off the end by tying an overhand knot in it and putting a whipping just back of the knot. In the illustration the rope is shown finished off with a small loop. This is sometimes handy as a means of drawing the rope through a block or eye.

If the foregoing is too difficult for the novice the ends of the rope after being tapered may be braided or plaited, which will answer the same purpose but does not look quite as neat.

This brings the writer to the end of his rope, and he closes the subject with the hope that a few at least of the many readers of *Carpentry and Building* will derive benefit from it.

There are men—very excellent mechanics, too, some of them—who claim that if they know their own trade thoroughly it is all that can be asked of them. This is quite true, and very few employers would be likely to find fault with a good carpenter, bricklayer or ironworker because he could not splice a rope. Still, other things being equal, it sometimes happens that if a man knows a few things outside of his own trade or calling he is able to hold his job longer or get a few cents an hour more than the other fellow; besides which, if he ever gets to be a foreman or a contractor, it is always a source of satisfaction to him to know that he can do any part of the work himself without being dependent on some one else.

Specifications for Cement Sidewalks.

Much interest attaches to the specifications for cement sidewalks, which are being adopted by various cities of the country, more particularly as regards the materials and proportions used. A few weeks ago the city of Detroit settled the vexed question and adopted the specifications presented below. It will be noted that "gravel" is omitted from the text, owing it is stated to the fact that a sufficient quantity of Michigan gravel of a satisfactory quality was not obtainable:

Sidewalks shall consist of a foundation of coarse cinder or broken stone 6 in. deep, a layer of Portland cement concrete 3 in. thick and a wearing surface of Portland cement mortar 1 in. thick, making the total thickness of the completed sidewalk at least 10 in.

Broken Stone for Foundation.

The broken stone or cinder to be used in the foundation shall be of approved quality, broken so that the largest dimension of any piece will not exceed 3 in. nor the smallest dimension of any piece be less than 1 in., and must be free from dust, dirt or other foreign matter.

Broken Stone for Concrete.

Broken stone for concrete shall be good, hard stone that will not be affected by the weather, broken so the largest dimension of any stone will not exceed 1½ in. nor the least dimension of any stone be less than ¼ in., and must be free from dust, dirt or other foreign matter.

Sand.

The sand shall be of the best quality of coarse, sharp, clean river or lake sand, free from dust, loam or other foreign matter.

Portland Cement.

Portland cement shall stand the following tests made by the city engineer: Not more than 5 per cent. shall fail to pass through a No. 50 sieve. When mixed neat with the least amount of water necessary to make a good mortar it will stand a tensile strain of not less than 134 lb. per square inch, after being allowed to set in air 1 hr., followed by immersion in water 23 hr., and 384 lb. after one day in air and six days' immersion. When mixed in proportion by weight of 1 part cement to 2 of sand, and exposed one day in air and six days in water, it shall stand a tensile strain of 146 lb. per square inch.

Water.

Water shall be fresh and free from earth, dirt or sewage.

Concrete.

The concrete shall consist of 1 part in volume of Portland cement, 3 parts of sand and 6 parts of broken stone.

Mixing Sand and Concrete.

The cement and sand in the specified proportion shall be thoroughly mixed dry on a tight platform, with shovels or hoes, until no streaks of cement are visible.

Mortar.

Water shall be added to the sand and cement mixed in accordance with the foregoing direction and in sufficient quantities to produce a mortar of the desired consistency, the whole thoroughly mixed with shovels or hoes until a homogeneous mass is produced.

Mixing Concrete.

The mortar, prepared as hereinbefore specified, shall be spread upon the platform, the proper quantity of broken stone, after having been thoroughly wetted, shall then be spread over the mortar, and the mass thoroughly turned over with shovels and hoes not less than three times, or until every piece of broken stone is completely covered with mortar.

Sprinkling.

Water shall be added by sprinkling during the process of mixing, if required to secure a better consistency.

All surfaces on or against which concrete is to be laid shall be thoroughly cleaned and dampened by sprinkling with water just previous to placing the concrete.

Spreading Concrete.

The concrete shall be evenly spread upon the foundation as soon as mixed in a layer of such depth that, after having been thoroughly compacted with rammers of approved pattern, it shall not be in any place less than 3 in. thick, and the upper surface of it shall be parallel with the proposed surface for the completed sidewalk.

Making Flags.

The flag or slab divisions shall be formed by cutting the concrete clear through on the required lines as soon as laid. The space made by the cutting tool shall be immediately filled with dry sand and rammed.

Size of Batches.

Concrete shall not be mixed in larger quantities than are required for immediate use.

Concrete shall not be dropped from too great a hight nor thrown from too great a distance when being placed upon the work.

Wearing Surface.

The wearing surface shall be composed of 1 part in volume of Portland cement and 2 parts of sand.

The cement and sand in specified proportion shall be thoroughly mixed dry on a tight platform with shovels or hoes until no streaks of cement are visible.

Water shall be added to the sand and cement mixed in accordance with the foregoing directions in sufficient quantities to produce a mortar of the desired consistency and the while thoroughly mixed with shovels or hoes until a homogeneous mass is produced.

Laying.

The mortar while fresh shall be spread upon the concrete base before the latter has reached its first set in such quantities that, after being thoroughly manipulated and spread over the concrete, it will make a layer 1 in. thick, conforming to the required grade and cross section.

Top Dressing.

A coating of equal parts of Portland cement and dry, fine sand, thoroughly mixed, shall be swept over the surface and the surface dressed and smoothed.

Flag Markings.

The surface shall be cut into flags, the markings to be made directly over the joints in the concrete and cut clear through the wearing surface.

The flags shall be turned up and marked, with the exception of a border about 1 in. in width along the edges, with a toothed roller.

The sidewalk shall be kept moist and protected from the elements and travel until it has set.

A Coal Veneered Office Building.

One of the most unique styles of finish for the exterior of a building has come to light in Milwaukee, Wis., where a one-story structure used for office purposes has been veneered with 8 tons of grate coal, the largest size of hard coal sold in that section. The idea was conceived as an advertisement for the coal company occupying the building, and while the cost of the veneering was about as much as would have been the cost if brick were employed, it required three times the labor in laying. The coal was laid in a cement of lavender tint. The mason contractor was George Scheiderer, 515 Twenty-eighth street, and the carpenter contractor was Nicholas Lauer, 1712 Galena street, Milwaukee, Wis.

DAIRY BARN OF PLANK FRAME CONSTRUCTION.

As a pleasing variation to the designs of building which have recently been illustrated in these columns we present herewith the elevation and plans of a dairy barn of plank frame construction erected a short time ago near the city of Cincinnati by Shawver Brothers of Bellefontaine, Ohio. The structure is built on the Shawver system and required the equivalent of 36 days to construct the framework. The porte-cochère is large and substantial and is only a short distance from the farmhouse door. The building, shown in Fig. 1, covers an area of 36 x 188 ft. and has two Kalamazoo silos at the rear, each 18 x 40 ft., with flumes full hight opening up into the feed alley. There are shown on the basement plan, Fig. 2, six large box stalls, 46 single cow stalls, milk room, herdsman's room, office, washroom and lavatory. The floors throughout the basement are of cement, except in the office and herdsman's room, where they are of Southern pine. The automatic watering troughs are supplied from a fine spring on a nearby hillside.

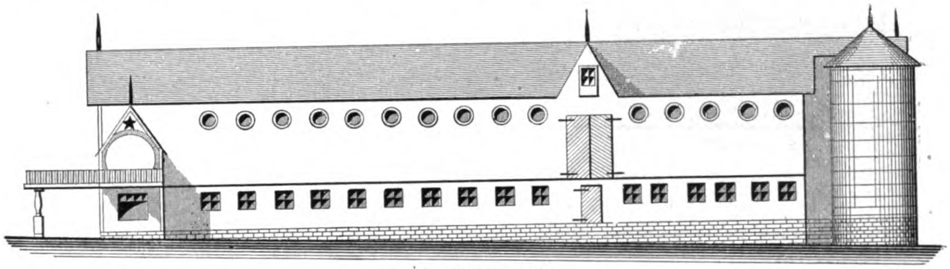


Fig. 1.—Side Elevation.

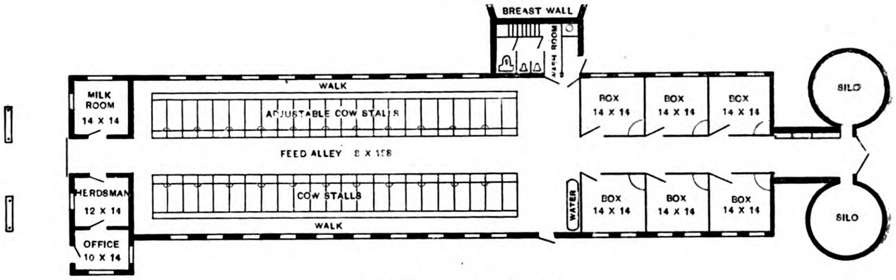


Fig. 2.—Basement Plan.

Dairy Barn of Plank Frame Construction.

On the main floor plan, Fig. 3, is shown the harness room, part of the feed bins, three box stalls for horses, six single stalls, an unobstructed barn floor, 36 x 112 ft. in size, the herdsman's bedroom and connecting balcony. There are also indicated the large doors entering from the incline through which the hay and grain is drawn on wagons to be unloaded.

The main feed bins, which are connected by chutes with the smaller boxes on the main floor and basement, are shown in Fig. 4. These bins are filled from a fourth floor in this part of the building, the feed being drawn up by means of rope and pulleys. The hay bay is filled by means of slings operated by horses. The grain is mowed on the main floor. The thresher is set outside the building and the cyclone stacker returns the straw to the barn through the round windows.

There is also shown a large gallery, 6 x 228 ft., reached by stairs from the main floor. The owners, Messrs. Kelley Brothers, are breeders of Jersey cattle and Poland-China hogs and they have arranged to hold their annual stock sales on the main barn floor, where the bidders may be sure of a comfortable place, free from the snows and winds of fickle March weather. The gallery is to accommodate spectators who attend the sales and do not care to mingle with the bidders on the main floor.

We understand that while this building was in process of construction another barn, 40 x 70 ft., was being erected a short distance away after the usual method of framing and which required the equivalent of 48 days' work. A test of the frames showed the plank frame barn, which was about one-third larger than the other, to be the more rigid of the two, and required about one-third less time to build.

Different Plans of Letting Contracts.

In a paper presented before the American Public Works Association Frank B. Gilbreth, New York, discusses "Lump Sum," "Percentage" and "Cost-Plus-a-Fixed-Sum" contracts. Under the "Lump Sum" contract the contractor agrees to furnish all labor and material necessary to complete a certain definite piece of work for a definite lump sum or at unit prices, which means several lump sums. The writer argues that under this form the interests of the owner and contractor are opposed from start to finish. Every cent that the contractor can save goes into his own pocket, but every cent the owner pays does not necessarily represent value received, since the owner may be paying not only non-competitive prices for extra work, but a large item of interest on his investment, and also for loss of rent, because the work is not progressing any faster than the rate of speed of greatest economy to the contractor. Any saving in time taken for riveting steelwork, in quantity of cement used, or in labor of mixing concrete, though the requirements of the specifications may be met, is a saving to the contractor.

Under the "Percentage" contract the contractor agrees to furnish all labor and materials necessary to complete the work for cost plus an agreed percentage of such cost. This form of contract, the writer says, is very nearly perfect—but not quite. "The owner can regulate the speed and the time of completion. He can decide whether or not he will give way to strikers or substitute nonunion men. The interests of the owner and the contractor are identical so far as speed of construction and the desire to obtain good work are concerned. So far, the chances of continued pleasant relations would be good if it were not for the fact that the owner is apt to suspect that the contractor may be in-

creasing the cost of the work for the sake of getting more profit, for the contractor's profit is in this case directly proportional to the cost of the undertaking."

The "Cost-Plus-a-Fixed-Sum" form has all the advantages of the "Percentage" contract, but without the one disadvantage of the latter; there is no incentive to the contractor to increase the cost, since it would not increase his profit. The owner is relieved of extra work. He has the benefit of all cash discounts for material and the owner, engineer or architect can make changes and alterations at any time without delaying the work. The benefits of the "Cost-Plus-a-Fixed-Sum" contract, taken from the contractor's viewpoint, are: The contractor has the opportunity to win upon his merits an enviable position in the confidence of the business world. The contractor's profit on a piece of work is assured. The contractor will be free from relations with owners who have not the courage to take legitimate risks attendant upon their own enterprises, and who wish to saddle them upon a contractor on a lump sum basis and leave him to gamble his way out as best as he can. The contractor has, on the other hand, the satisfaction of dealing with an owner who has no reason to suspect him of overreaching, who is not in constant dread of extortionate charges for "extra work," and who, in a word, has a contract offering complete insight to the financial affairs of the job.

Of "Cost-Plus-a-Fixed-Sum" contracts in which the contractor guarantees a maximum cost the writer of the paper has this to say: "At first glance these look as if they had all the advantages of the 'Cost-Plus-a-Fixed-Sum' contract and the 'Lump Sum' contract combined, but they have nothing of the sort. On the other hand, they are absolutely nothing more or less than 'Lump Sum' contracts (if they have a guaranteed maximum cost) and the 'Fixed Sum' is 'fixed' only in case the maximum is not reached. The entire theory of the Cost-Plus-a-Fixed-Sum' contract is that the owner shall have his own way in any and all matters pertaining to his work. He shall have the right to decide what materials shall be bought and whether or not they shall be bought of the lowest bidder. He shall have the right to order the contractor to put on as many or as few men as the owner wants regardless of whether or not there are strikes. His decision shall be final regarding the paying of bonuses for the quick delivery of material, and his decision shall be final on all matters pertaining to the conduct of the job. It is obvious that under these conditions it is ridiculous to expect any contractor to guarantee any maximum cost. If the 'Cost-Plus-a-Fixed-Sum' contract is to be used, let the owner pay for all of the actual cash cost and have it understood how much actual profit the contractor is to have, and that the entire 'Fixed Sum' is to be net profit to the contractor."

◆◆◆

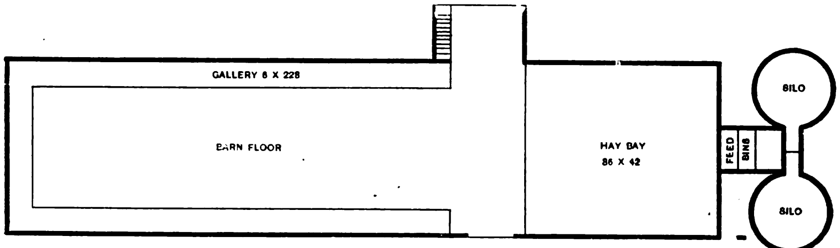


Fig. 4.—Gallery Floor.

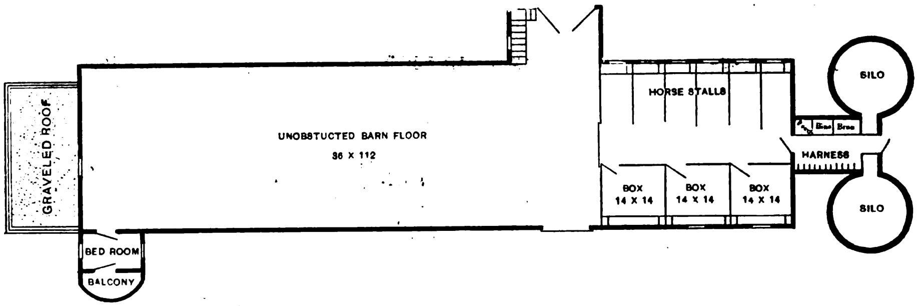


Fig. 3.—Main Floor.

Dairy Barn of Plank Frame Construction.

A Skyscraper of Concrete.

Immediately adjoining the new Marbridge Building now in course of erection on the northeast corner of Broadway and Thirty-fourth street, New York City, Samuel Green is constructing a 12-story office building of reinforced concrete, and which, with that going up in West Thirty-ninth and Fortieth streets for the McGraw Publishing Company, is the first concrete building of its kind to be put up in this city. It has a frontage of 50 ft. in Thirty-fourth street and extends 198 ft. through to Thirty-fifth street, where it has a frontage of 30 ft. The work at present is being pushed forward as rapidly as circumstances will permit, the wooden frame work presenting, as in the case of all high structures of concrete, a very curious effect. The cross girders in the building are 20 x 24 in., with a span of 30 ft. The floor beams also of concrete are 4 x 6 in., with spans of 14 ft. The stairs will also be of reinforced concrete, and the floors will be of colored cement scored in squares and capable of standing a weight of 500 lb. to the square foot. Iron upright columns will be used through the center of the building, and will be incased in concrete, as the Bureau of Buildings does not recognize concrete uprights. The architects of the building are Samuel Sass and Howells & Stokes, while Prof. R. T. Dana is consulting engineer, and Edwin West, Jr., superintendent of construction.

◆◆◆

In connection with the 25-story office building which is being erected at Nos. 37 to 41 Wall street, New York City, for the Trust Company of America, an interesting feature of the foundation work was the steel traveler. It had four masts and four booms, one at each end of its four corners, and was calculated to lift from 10 to 15 tons on each boom without difficulty. In providing the foundations for the building 15 caissons of varying size were sunk around the outer line of the site to bed rock, 75 ft. below the street level, while within the area were eight caissons which were carried to the same level.

CENTERS FOR ARCHES OF DOUBLE CURVATURE.*—XI.

By Charles H. Fox.

We show another example of a cylindro-cylindric sash in Figs. 42 to 52. This has been jointed in the center like the last example, but the quantity of material required in the plank has been reduced to a minimum. In Fig. 42, which represents the plan, O is the center with which the curves J B″ E′ and I U′ F, respectively, of the outer and inside faces of the rail may be drawn. The half width of the opening is given in c P′. In Fig. 43 is shown the geometrical elevation of the rail, the curve line S 3 6 representing the soffit. This is drawn with A as center and c P′ as radius.

The falling mold of the convex surface is shown in Fig. 44. This pattern may be developed, and to the direction given in the points 7 8 9, &c., of the developed curve of the exterior bonding surface the elevation may be completed in the manner fully explained for similar developments in connection with diagrams in Figs. 24, 25 and 26 in a previous issue. In a similar manner project the point as that of 10 in Fig. 43 into the point U of the plan and draw the line U Z square with the line A E. Then draw the vertical Z Z′ parallel with the center line, and the horizontal Z′ 10 H through 10; then, by setting off 10 H equal to Z′ 10 the position of the point H, through which to draw the line A′ 17 giving the projection of the inclined top surface of the plank may be obtained.

It will be noted that in similar constructions given in connection with the preceding example the line A 17 has been drawn parallel with a tangent to the point in 10. Here, in order to get the rail out of the smallest possible quantity of rough stock and at the same time have the inclined surfaces of the plank of the same pitch, the line in question is drawn parallel with that shown in S 6, which joins the two extreme points of the soffit curve. In making the inclined surfaces of the plank of the one pitch, one face mold, as shown in Fig. 47, is sufficient for the purpose. This understood, draw A′ 17 through the point H and parallel with S 6, then square with A E of Fig. 42 draw A A′ and E E′ and parallel with the center line draw 17 16. Make A A′ equal to the corresponding length in Fig. 43 and joining A′ 16, the inclined line of the top surface of the plank may be developed. Next parallel with A′ 16 draw C C′. If the drawing is correct this line will touch the curved line of the soffit at its intersection with the line A A′.

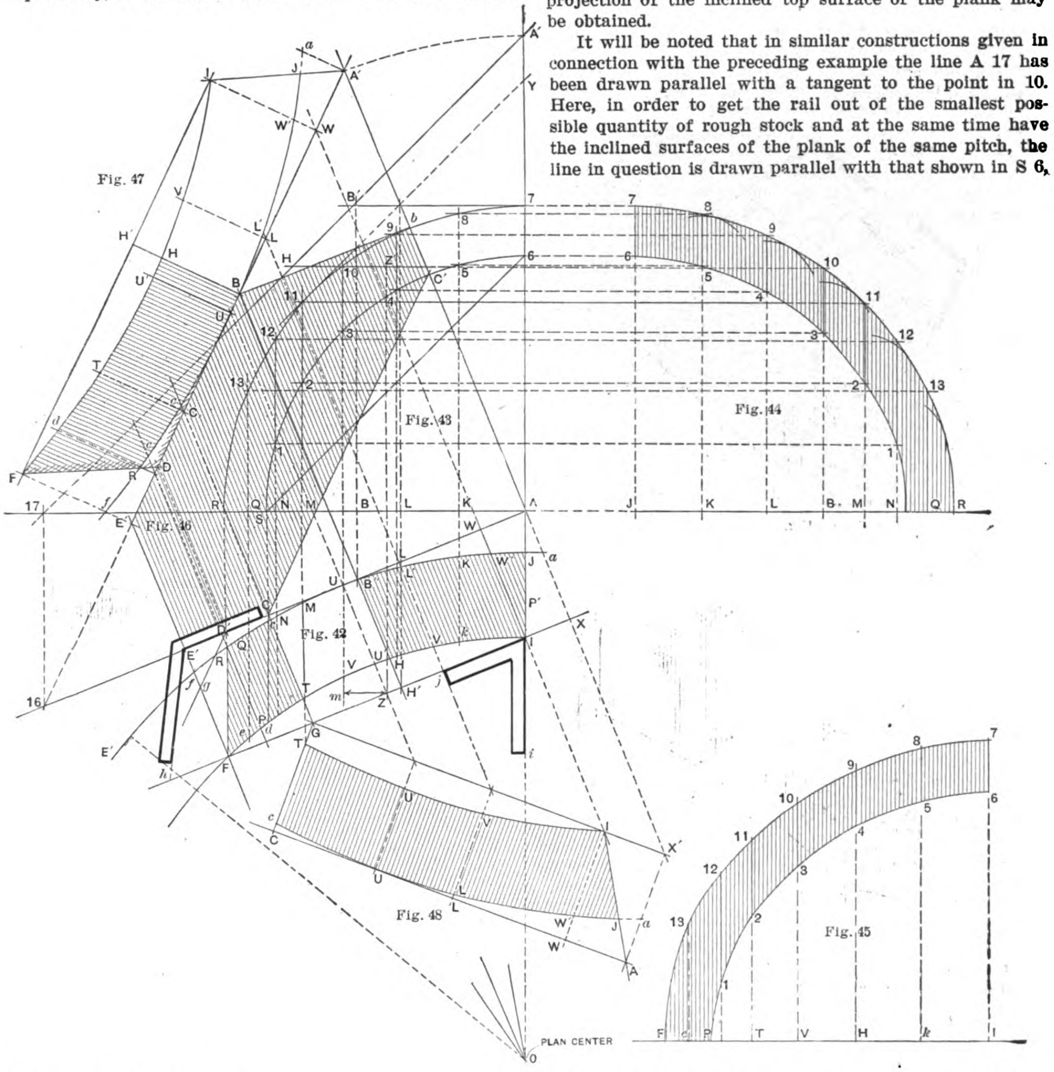


Fig. 42.—Plan of Half Sash.
Fig. 43.—Elevation of Half Sash.
Fig. 44.—Developed Falling Mold as Required at Outside Face.
Fig. 45.—Developed Falling Mold as Required at Inside Face.
Fig. 46—Shape and Size of Plank Out of Which Rib May Be Formed.
Fig. 47 —Developed Face Mold for Top Oblique Surface.
Fig. 48.—Developed Face Mold for Lower Oblique Surface.

Centers for Arches of Double Curvature.—XI.

---

* Copyright, 1906, by Charles H. Fox.

Now in Fig. 43 draw 7 B′ square with the center line A A′ and this will be the projection of the surface, which will form the top proper of the plank. From the point given in B′ at which the horizontal meets the line A′ 17 and parallel with the center line draw B′ B″. Again in Fig. 42 square with A E draw H′ B″ B. The figure shown by J B′ H I gives the pattern as required at the horizontal top surface of the plank, for giving the direction for forming the cylindrical surfaces of the faces of the rail. In Fig. 46 make B″ B equal to the length of the corresponding vertical in Fig 43; square with A A′ draw *b* B. The size required at the face of the plank is shown in the figure included within the lines E C C′ *b* B E′ E of Fig. 46. Now square with A′ 16 draw A *a* X′, W *w*′ I. L L′ *g*, &c. These are the horizontal projections of the plan ordinates, which give in Fig 47 the direction required in order to develop the curves of the face mold. The method by means of which the points may be found through which to trace the curves has already been explained in connection with similar operations.

The shaded portion of the face mold comprised within B H F R B is that required at the upper inclined surface, and that comprised within J I T *c* B J is that required at the face mold of the lower inclined surface of the plank. This latter pattern is also shown in Fig. 48, where X X′ is made equal in length to A C′ above; then drawing G X′ the inclination of the lower surface of the plank may be obtained. By producing the plan ordinates as shown the face mold may be developed in the manner already explained for similar development above.

Complete the construction of the patterns as required by developing the falling mold of Fig. 45, which is that required at the concave face, and by making a pattern which may contain a copy of the plan, as comprised within *c* R F T *c*, as required to give the direction at the lower joint surface, the necessary patterns may be developed. Then construct the bevel containing the angle C D F of Fig. 47; that of the angle C E *h*, as required at the lower joint surface, and another one, as shown in I *j* *i*, as required at the horizontal surface *b* B, to give the direction for forming the center joint surface.

The manner in which the bevels may be constructed will be apparent from the drawing. Now select a plank of sufficient size and dress up the surface of the outer face of the plank. Then apply the pattern of Fig. 46 and work the inclined surfaces of the top and under sides of the plank. Now work the lower joint surface and that of the horizontal surfaces, as shown, respectively, in C D F G and B H I J of the diagram of Fig. 49. Note that these surfaces are made square, both with the surface of the plank and to the lines D D′ and B B″ of the pattern, Fig. 46. Transfer to the top surface the angle contained in I *j* *i* of the plan, and to its direction work the center joint surface. Then, as shown in Fig. 49, transfer the curves of the face molds to the surfaces of the plank. The method adopted by the writer of doing this has been to first cut the face molds of Figs. 42 and 47 along the line A′ D, cutting out to the concave curve and to the joint lines. Then placing the pattern with the line A′ D to the outside face of the plank the concave curve may be marked legibly at the surfaces. This done cut the pattern to the direction as given by the convex curve; then at the second application of the pattern to the surfaces of the plank it may be placed exactly in the position it first occupied, as the proper direction for this is given by the curve already marked at the surfaces. In this manner the points, as those shown in U T of Fig. 49, may be obtained without any trouble whatever.

Now to the direction, as given by the patterns, work the cylindrical surfaces of the plank. As before mentioned care must be observed so that the surfaces are straight only on lines which are parallel with those of D D′ and F F′. The resulting solid is that as shown in Figs. 50 and 51. Now mark at the convex surface the falling mold of Fig. 44, and parallel with the line 7′ 7 draw 6 6′ of Fig. 51.

In the same manner the line S P may be drawn parallel with the line R F, the direction of which has been

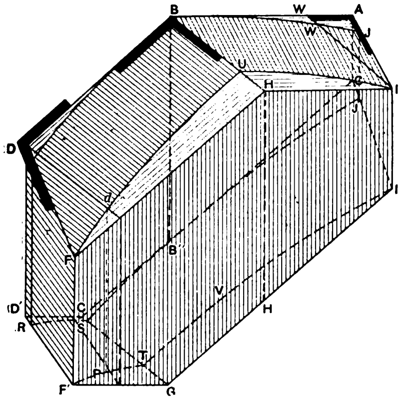


Fig. 49.

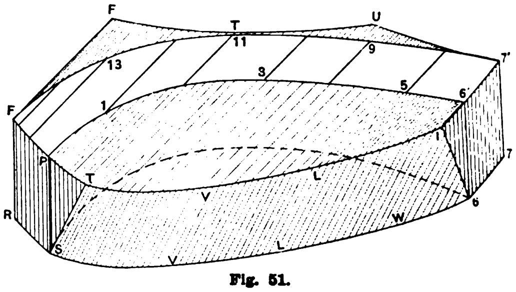


Fig. 51.

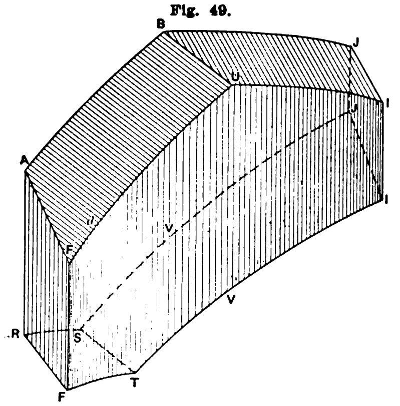


Fig. 50.

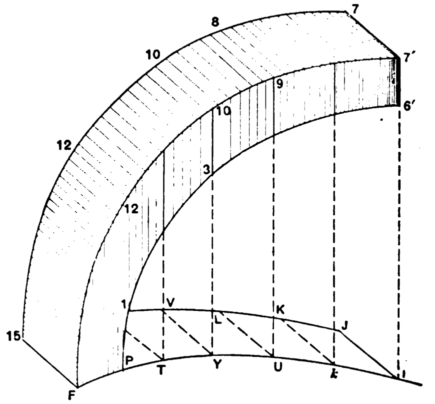


Fig. 52.

Fig. 49.—Diagram Showing Operation of Squaring Up of Plank.
Fig. 50.—Projection Showing Squaring Up of Plank Ready for Application of Falling Molds.

Fig. 51.—Diagram Showing Application of Falling Molds in the Operation of Squaring Up of the Rail.
Fig. 52.—Projection Showing Finished Solid of Rail Pieces.

Centers for Arches of Double Curvature.—XI.

given at the application of the bevel C E *h*. The points are now given in 6 P F 7, at which to apply the falling mold of Fig. 43. To the direction as given by the patterns, and in the manner explained at the preceding chapter for the similar operation, may the cylindrical surfaces of the soffit and exterior bounding element of the rail be formed.

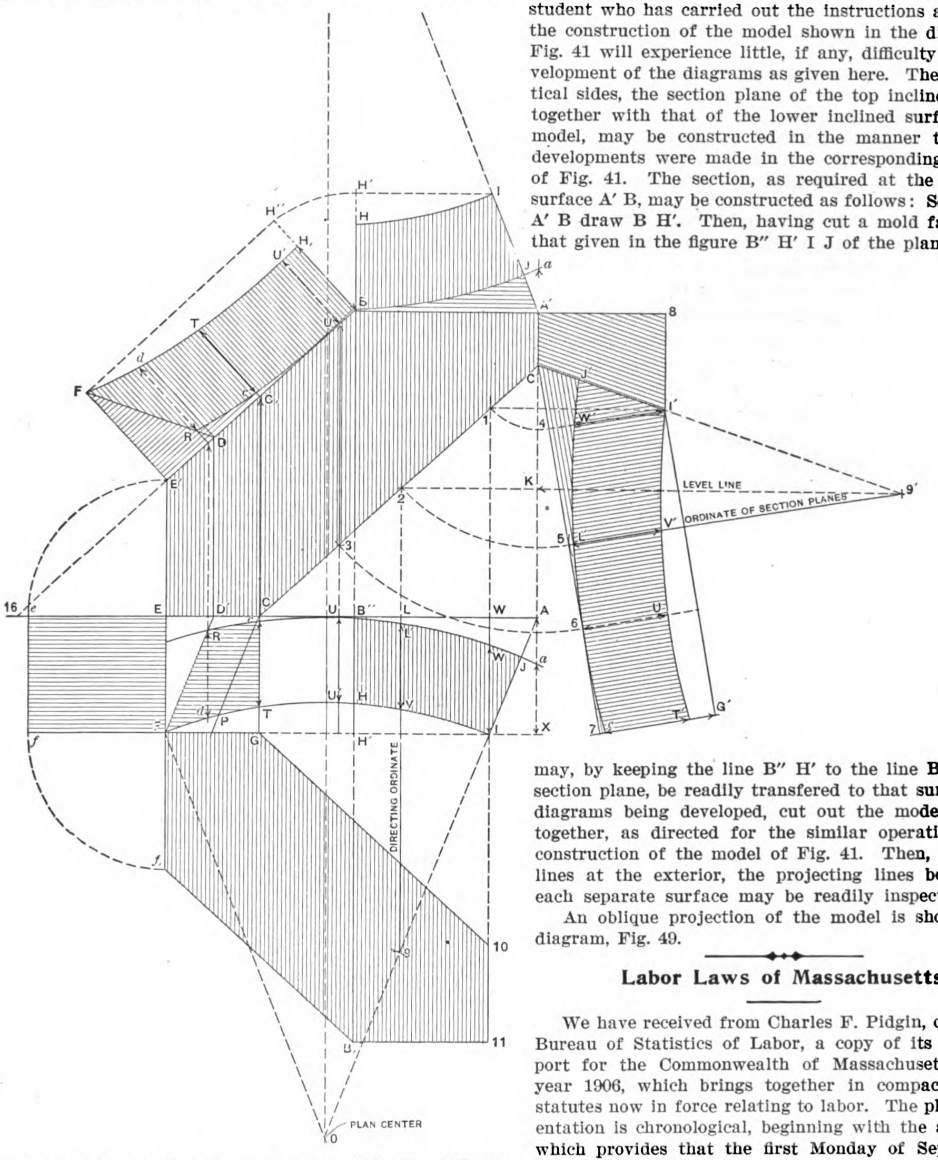


Fig. 53.—Diagram Showing Construction of Cardboard Representation of the Problem Illustrated in Figs. 42 to 48.

Centers for Arches of Double Curvature.—XI.

A geometrical elevation of the rail as now formed is given in the diagram of Fig. 52. Now mark at the joint surfaces the contour, as required of the finished rail, and in the manner which suggests itself work out the mold and so finish the solid of the rail. The opposite hand—that is, the other half of the sash—may be formed in a similar manner, taking note of course that the plank will be made of the opposite "hand" to that just worked.

With the development of the diagrams shown in Fig. 53, we shall again explain the construction of a cardboard representation of a solid, showing the actual inclination and position, together with the development of the sections and bevels, which belong to the several surfaces; each section, respectively, being developed and applied in its own plane; of a plank out of which a rib piece comprising one-half of a cylindro-cylindric sash may be formed. A full description has been given in connection with the diagrams, Figs. 42 to 48.

As already noted, in the explanations given in connection with the diagrams of a preceding chapter, the finished solid of this problem is similar to that of the diagrams, Figs. 24 to 31. The difference here has been made in the method of "squaring up the plank." The student who has carried out the instructions as given at the construction of the model shown in the diagrams of Fig. 41 will experience little, if any, difficulty in the development of the diagrams as given here. The three vertical sides, the section plane of the top inclined surface, together with that of the lower inclined surface of the model, may be constructed in the manner the similar developments were made in the corresponding diagrams of Fig. 41. The section, as required at the horizontal surface A′ B, may be constructed as follows: Square with A′ B draw B H′. Then, having cut a mold facsimile to that given in the figure B″ H′ I J of the plan, the same may, by keeping the line B″ H′ to the line B H′ of the section plane, be readily transfered to that surface. The diagrams being developed, cut out the model and fold together, as directed for the similar operations in the construction of the model of Fig. 41. Then, having the lines at the exterior, the projecting lines belonging to each separate surface may be readily inspected.

An oblique projection of the model is shown in the diagram, Fig. 49.

◆◆◆

Labor Laws of Massachusetts.

We have received from Charles F. Pidgin, chief of the Bureau of Statistics of Labor, a copy of its annual report for the Commonwealth of Massachusetts for the year 1906, which brings together in compact form all statutes now in force relating to labor. The plan of presentation is chronological, beginning with the act of 1887 which provides that the first Monday of September of each year be a legal holiday and be known as "Labors Holiday," and followed by quotations from the revised laws of 1902 amended according to subsequent legislation. These in turn are followed with the enactments of subsequent years. The amendments wherever practicable have been incorporated in the draft of the original law presented in the report and the particular act by which the amendment was made has not been included but simply referred to by chapter and date.

◆◆◆

A LOFT BUILDING, 50 x 90 ft. in size, 11 stories in hight and estimated to cost $250,000, is about being erected at Nos. 10 and 12 Morton street in accordance with plans prepared by B. W. Levitan, 20 West Thirty-first street, New York City. The plans specify an exterior of limestone, light brick and terra cotta, with terra cotta coping, tile roof, &c.

Carpentry and Building

WITH WHICH IS INCORPORATED
THE BUILDERS' EXCHANGE.

DAVID WILLIAMS COMPANY, - - PUBLISHER AND PROPRIETOR
14-16 PARK PLACE, NEW YORK.

DECEMBER, 1906.

Short Rules in Building.

Much has recently appeared in these columns about short methods of doing work and the advantages resulting from an intelligent understanding of their application, but there remains another side to the question which it may be well to consider. No one will deny that short cuts and rules in connection with building problems have done much for the advancement of the industry and that they are a valuable asset where economy of time and effort count. The investigator feels he has accomplished something when he has secured the essence and evolved a concentrate which gives us in the instant a concrete idea. If he has been a student of engineering phenomena and has classified his observations he is pretty sure to forward some formula, rule or law, as a help to followers in the same kind of work. The reward in the shape of popular approval is no little incentive to the continual unfolding to the public interested of facts and data, though the chance of giving something of unusual or unexpected lasting value is an underlying motive, and the result is there is a growing multiplicity of rules and formulas until one must be careful lest a rule is used that does not apply to the conditions at hand. When that situation arrives the object of the rules is largely defeated, and then an introduction to a new set is valuable practically only in leading to added study of the subject, or perhaps only to entertainment in traversing with the author the steps of his argument. In fact too much dependence on rules begets forgetfulness of the fundamental truths or experimental data on which they are based. When the unusual arises the rules fail to hold and unless one understands the basic ideas he cannot intelligently handle his problem. If on the other hand he does know how calculations should be made he soon evolves short cuts for himself. To have as many rules as there are days in the year, however, is useless, if not certainly confusing. One need not feel lacking if he is not familiar even with the existence of various rules or formulas, for it is probably best only to adopt those which best suit the conditions under which he labors, having properly always in mind the limitations within which they apply. The burden of the foregoing remarks is that rules should always be secondary, or else one will rarely be able to do more than the mediocre. Rules are valuable, but must be employed with judgment. The time is passing when a man can use a 12-in. I-beam where an 8-in. would suffice, or a 3-in. pipe where a 4-in. is needed.

Trade Instruction for Registered Apprentices.

At a recent meeting of people interested in the trade classes of the Young Men's Institute of Louisville, Ky., W. I. McNair, for the institute, stated that in the case of the plumbing classes he would open the doors to registered apprentices working at the business, to the exclusion of all other applicants. If the boys take advantage of this opportunity as they should it will better conditions in every way. The journeymen, to whom the boys look for instruction and who really have their welfare in charge, will be relieved of a load of training and technical instruction work, which is irksome under the stress of the eight-hour day and the present lack of sufficient capable help to carry the regular work of the shops easily. The character of buildings and multiplication of plumbing fixtures has of late years so lengthened the time necessary to complete a job, even outside of the larger cities, that in many cases a boy might serve the ordinary term on a few jobs and know almost nothing about other branches of the business which he would be expected, as a journeyman, to handle with ease. The fact that any reasonable term of apprenticeship is inadequate under present conditions, without the aid of the lecture and practice rooms, is now becoming apparent to the journeymen. They realize that the general groundwork of principles and practice afforded by an evening class will bring to their organization a better type of competition than will otherwise seek admittance. With trade classes tabooed, short terms or no terms at all, and nobody in particular responsible for the education of the boys—conditions that have existed here or there in the past—the worst form of competition is being built up against both the masters and the journeymen.

Putting Tin Roofing Industry on High Plane.

Architects, builders, tin roofers and the public in general are to be congratulated on the courageous attitude taken by the manufacturers of terne plates in insisting that the tin plate business shall stand upon the rock foundation of "the square deal." *Carpentry and Building* takes pride in reciting that this industry which, since the enactment of the McKinley bill, has come to be regarded as a monument to the skill, energy and sagacity of American ingenuity is among the first, without coercion, to catch up the war cry of the twentieth century and in its refrain announce to the world that the proper conduct of business demands a high moral standard. The sale of roofing plate is to be revolutionized. For decades, for a century or more, this article of commerce has been sold by private marks, by twisted, thread-worn, meaningless appellations, such as "Old Style," "Old Method," "Redipped," &c. In early days, no doubt, these terms meant something, but in the scramble for business through these long years they have become hopelessly confused, and the buyer of roofing plate has found himself groping about with a bewildered and faltering step among the honest or dishonest assertions of this salesman or of that. All this is to be changed—the architect, the roofer or the house owner, provided only he can read—is to be able to secure precisely what he pays for, and is to be able himself, without any technical knowledge, to determine this point absolutely. The American Sheet & Tin Plate Company officially announces that it has decided, on all of its brands of roofing plate, to stamp each sheet with the amount of coating it carries per box of 20 x 28, and not only this, but every waster plate is to be stamped "waster." This will in a large measure prevent the possibility of misrepresentation in second, third or fourth hands and insure to the one calling for such a plate a square deal. That the company which has taken the initiative in this innovation runs some risk of a loss of business during the period when architects, builders and roofers are being made familiar with such a frank statement of quality must appear evident to all who give more than superficial attention to the far-reaching action. The move strikes at the very heart of the industry. It con-

RESIDENCE OF MR. B. FRANK HOWELL, JR., ON EAST MAIN STREET, RIVERHEAD, N. Y.

EDWIN H. BLUME, ARCHITECT

STAIR HALL IN RESIDENCE OF MR. B. FRANK HOWELL, JR., ON EAST MAIN STREET, RIVERHEAD, LONG ISLAND, N. Y.

EDWIN H. BLUME, Architect

Supplement Carpentry and Building, December, 1906

Carpentry and Building for 1907

WITH this issue of the paper we mark another milestone in the career of *Carpentry and Building* and bring to completion a volume which is the largest if not the most important thus far in its history, wherein has been chronicled the conspicuous happenings and developments of the year connected with the building industry. At this time, in accordance with a custom established some years ago, we present a "Prospectus" for 1907, briefly outlining a few of the leading features which will characterize the paper for that period. During the twenty-eight years which *Carpentry and Building* has been before the trade it has been the practical exponent of improved methods of building construction as they appeal to the progressive and ambitious carpenter and builder, making its columns educational in character and tending to promote the best interests of those engaged in the various branches of the trades addressed. We desire to state, in briefly outlining the campaign for the new year, that as the aim in the past has been to make the paper preeminently practical in the field which it covers, so in the future the endeavor will be to serve in every way possible the best interests of the vast army of our readers. No effort will be spared to maintain *Carpentry and Building* upon the same high standard of excellence already established, a feature to which we are constrained to call attention by reason of the multitude of letters from its patrons testifying to its increasing popularity. We shall, in the new year, present for consideration special articles on various architectural and mechanical subjects prepared by writers of experience and ability, thus rendering these communications of more than usual importance and value to those connected with the building and allied trades. A conspicuous feature will be the opinions of architects, contractors, carpenters and builders touching problems arising in their daily practice, while a birdseye view of the building situation will afford valuable information for mechanics in all parts of the country. Briefly it may be stated that a wide range of topics will be discussed, and in addition to the special features enumerated below, we shall from time to time present many others calculated to interest and instruct mechanics in all branches of the building business.

A prominent and attractive feature will be the illustrations appearing in the different issues of the volume for the new year, these being executed in the highest style of the engraver's art and covering perspectives in the shape of half-tone reproductions from photographs of completed structures, together with elevations, floor plans and details of modern dwellings of frame, cement and concrete block construction, carriage houses and stables, barns of various kinds, churches, suburban railroad stations, business buildings, etc., the subjects embracing, so far as possible, work already completed, and presented in such shape as to be of the greatest possible value to the architect and builder. The rapid progress which is being made in the use of concrete in connection with buildings of all kinds affords opportunity for the presentation of interesting examples of work of this kind as well as of hollow block construction, and some of these will constitute features of the new volume.

Construction in Detail of a Modern Dwelling,

One of the most important features of the volume for 1907 will be a series of articles giving in detail the various steps in connection with the construction of a modern dwelling. The subject is a house costing in the neighborhood of $7000, and the author, beginning with the breaking of the ground, takes the reader through the various successive steps and stages until the building is ready to be turned over to the owner. He describes the laying out of the foundations, the excavation and economical placing of the dirt; tells how the foundation walls should be laid; shows the proper placing of the sills, the framing timber. and the superstructure; methods of bracing and bridging; discusses economical and rapid methods of scaffolding; touches upon the enclosing of the building and the roof; the laying out of the work and cutting for the furnaceman and plumber; gives short cuts in roof framing; describes the proper placing of heading timbers, &c., setting grounds for the plasterer and the protection of floors during plastering, after which he takes up the work of preparing for the inside finish and the trim. He then discusses odd work, such as cupboards, closet trim, seats, china cupboards, &c., all in a way to interest and instruct the young mechanic who is just starting out in the building business and who desires to know how to proceed with the work to the best advantage while at the same time it affords significant hints to even older members in the trade. An important feature of the treatment of the subject is found in the running comments on estimating, economical handling of labor and materials, and many other practical suggestions, which would naturally be brought out in the discussion of a matter of this kind. The manuscript is profusely illustrated by means of direct reproductions from photographs and also line drawings. clearly indicating the details of the work in hand. The subject is treated from the standpoint of a practical builder, who is his own foreman, and the matter is written by one especially fitted for the work by reason

of his own personal business experience in this direction, both from the standpoint of the architect and that of the contractor. The manuscript has been prepared by Mr. Frank G. Odell, whose articles on "Laying and Finishing Hardwood Floors" in the early issues of this year attracted widespread attention and favorable comment.

This phase of the building business is one of unusual interest to the younger element in the trade, by reason of the fact that the field has never before been covered in just this shape, and those who are ambitious to become successful builders will find in this contribution to the subject a vast fund of practical suggestions which cannot fail to be highly appreciated. The lack of such a treatment of modern residence construction, dealing with the various consecutive steps of the work in detail, has long been keenly reflected in repeated requests for books giving the desired information in the shape in which we shall present it in the volume of *Carpentry and Building* for the new year. Taken altogether the manuscript may be regarded as one of the most valuable along the lines indicated which it has been our privilege to present to the attention of the readers.

Supplemental Plates.

Architects and builders in all parts of the country are greatly interested in the wonderful progress which has been made in recent years in the methods of building construction as exemplified by the towering skyscrapers and business blocks which are to be found in the leading cities, and in order to afford an idea of the work now being done we shall from time to time present photographic reproductions of some of the more striking examples of steel skeleton frame construction, reinforced concrete, &c. These in connection with pictures of attractive architecture in the way of dwellings, carriage houses, stables, barns, churches &c., will constitute the basis of our supplemental plates—a feature which has proven very popular in the past and which will be continued in the future in accordance with the highest state of the engravers' and printers' art. These plates will for the most part be accompanied by elevations, floor plans, and constructive details, all drawn to convenient scale, together with brief descriptive particulars, thus rendering each study so far as possible complete in itself. The house designs will vary to such an extent as to especially adapt them for execution in the smaller cities and towns, as well as upon suburban sites.

We shall be glad to have architects and builders everywhere forward for publication tracings and photographs of attractive buildings which may have recently been erected, to the end that work in widely scattered localities may be brought to the attention of all interested readers. In this connection we desire to emphasize the fact that no charge whatever is made for publishing acceptable designs, all engravings being made at our own expense, while in every instance the author is given full credit for his work. The drawings submitted may be in the form of tracings or blue prints, according to the convenience of the architect. After the matter has been published the drawings are returned to their authors free of charge.

Unique House Moving Operations.

Although the moving of buildings from one place to another without in any way detracting from their usefulness is not altogether a novel occurrence, yet there are opertions which involve unique and ingenious methods of accomplishing the work. One of the features of the volume of the paper for the coming year will be a description of the manner in which a two-story frame building, consisting of a railroad station and agent's dwelling, was moved a distance of about 3½ miles on a single track road. The size of the structure exclusive of projections was 22 x 76½ feet, while the bay on each side was 13 feet wide and projected 4 feet. The author of the article, E. H. Crussell, explains that the building was carried on six flat cars drawn by a locomotive, and he describes the scheme of anchoring the structure so as to keep it balanced on its narrow wheel base. At the same time he goes somewhat into the matter of loading long material on open cars in what is known as twin or triple loads—that is, material which is too long for a single car, so that the uninitiated may understand in a measure some of the difficulties attending the moving of buildings by this means.

The author also describes the moving of another building on a single track a distance of 9 miles. The structure was 19 x 47 feet with 20-foot side walls, and in order to keep the building balanced on a 4-foot 8½-inch wheel base old coal cars were used at the ends of the building with timber outriggers. The entire subject is illustrated by means of photographs and drawings clearly indicating the details of the work, and we have no doubt the matter will prove highly interesting to a large circle of readers.

Correspondence.

There are constantly arising in the everyday practice of the carpenter and builder problems involving in their solution interesting features, and a discussion of which always proves entertaining and profitable to the craft. This interchange of ideas between practical members of the trade renders the Correspondence Department one of the most valuable features of the paper, for in it there is presented each month selections from the editor's mail, accompanied by illustrations carefully prepared from the sketches, either pen or pencil, which may be submitted with the letters of our correspondents. During the 28 years *Carpentry and Building* has been published this department has steadily grown in importance, and practically every phase of building construction has been considered in a way to interest and instruct those who were seeking the information. The department in the future will be conducted along the same lines which have rendered it so valuable in the past.

With a view to stimulating interest in the department and rendering it, if possible, still more valuable, we cordially invite all our readers to contribute to its columns, either by asking questions, answering the inquiries which may be submitted by those seeking information, discussing topics of trade interest, describing peculiar jobs of work which they may execute or with which they may be familiar, or in some other way taking an active interest in the welfare of the paper. The opinion of every one, however trivial he himself may regard it, is of interest because its expression in print often serves to draw out the views of those who are too modest to take the initiative and thus develop an interchange of ideas which cannot fail to be both instructive and valuable to all concerned.

The Jobbing Carpenter and Some of His Work.

From the almost infinite variety of books at present on the market dealing with the subject of carpentry one might suppose that the entire field had been covered so thoroughly as to leave little if anything more to be said. There is, however, one phase of the art and science which has not yet been explained to any extent in the text books of the trade, and that is the work connected with the jobs which are constantly cropping up in the everyday practice of the carpenter. These are more in the line of repairs, perhaps, than in the construction of buildings, but they are things which can only be learned by experience. A mechanic may be called upon to cut a doorway through a plastered wall, and yet to do this seemingly simple job in such a way that it will not be necessary for the plasterer to come in and finish up after the carpenter has completed his work, constitutes a job that will be more easily accomplished the second time than the first. It is with a view to assisting the younger men in the trade—those who are desirous of making progress in their chosen calling and fitting themselves for greater responsibilities—that we have arranged for a series of articles on the subject indicated by the above title. The matter has been prepared by one who has had a long and varied experience in the trade and is thoroughly familiar with all its details. The illustrations are of a nature to clearly indicate the manner in which the work is done, and the manuscript will doubtless be found interesting reading, not alone by the younger element, but also by many of those not altogether new to the trade.

What Builders are Doing

Another year of unexampled prosperity in the building line lends peculiar interest to the bird's-eye view of the general situation which has been published from month to month, affording contractors and builders an excellent idea of the condition of the building business in the leading sections of the country. During the coming year this department will be conducted along the same general lines as in the past, the information presented being based upon the reports from secretaries of leading builders' exchanges and from those prominently identified with the building business. Reference will also be made to important happenings in connection with the different builders' exchanges, describing those matters likely to prove of special interest to the trade at large and particularly to members of the building fraternity located in cities where no local exchange has been established. The movement has assumed such proportions in the last few years as to make the Builders' Exchange an important influence in a community, and what it is accomplishing in conserving the building interests of a city is of particular interest and value to the trade everywhere.

In order to make this department of the paper as interesting as possible and keep our patrons informed of what is going on throughout the country in the building line, we invite architects, contractors and builders everywhere to send us records of experience on matters of importance to the trade.

Cabinet Work for the Carpenter.

The articles from the pen of Mr. Otter dealing with various forms of cabinet work which are within the ability of the clever mechanic to execute will be supplemented in the coming volume by a series of contributions which will relate among other things to bookcases, music stands, clothes

chests, china cabinets, reception chairs, smoking cabinets, gentlemen's chiffoniers, sewing stands, &c. While it is possible that none of these things may be regarded as absolutely essential to the home, yet when once possessed they are apt to prove indispensable. There will be a short article on glove and jewel boxes and another dealing with ornament in furniture, wherein attention will be given to the kind, place and method of producing it, as well as its application. These naturally follow in line with previous articles by this author, giving those refined touches to the home which help to make it so attractive, while on the other hand they afford suggestions in the way of a remunerative class of work as the author originally intended the articles to do. The illustrations will be along the same general lines as those heretofore presented, dimensions and sizes being given where necessary to assist the mechanic clever with his tools in executing the work.

Miscellaneous.

In addition to what has been referred to above we shall present in the new volume occasional articles connected with wood turning, together with some comments on bracket building, in which the author deals with the many forms of brackets which enter into building construction, some being for strengthening purposes and others for decorative effects only, while others again will include a combination of both. The innumerable and ever varying forms of design and construction will make interesting and instructive additions to what has already appeared on the subject. There will also appear an article on "Lathe Attachments and Their Uses," by Mr. Tobyansen, whose contributions in the past have evoked much favorable criticism. The new volume will also contain a vast amount of miscellaneous matters selected on broad lines and of such a nature as to afford members of the building trades information on a great variety of timely topics. There will be described in an early issue one of the many important building operations, embracing an entire block of dwellings, in a nearby city where during the past two years thousands of two-story houses have been erected in connection with the improvement of suburban property. The article will be illustrated by means of direct reproductions from photographs, together with elevations, floor plans and details. The subject of concrete construction will be frequently considered and more or less space will be devoted to roofing, plumbing, sheet metal work, heating and ventilation, improvements in apparatus, tools and devices connected with the building business, as well as details of modern building construction as supplied by practical builders and mechanics all over the country. The serial article on "Centers for Arches of Double Curvature" will be concluded in the new volume. The value of brick for residence construction will be considered; a small wood working shop will be illustrated and described, and an extended article on the treatment of curves, intersecting flights and landings of stairs will be found an important contribution to the subject of stair construction. There will be comments on reinforced concrete piles; a design for a poultry house will be presented; the heating of a swimming pool will be described, while the work of an architect and some of the problems he has to consider will constitute a few of the other features which the new volume will contain. In concluding this outline of our campaign it may not be out of place to state that *Carpentry and Building* for 1907 will in all respects be maintained upon a plane calculated to render it of the very highest value to the practical building mechanic with whatever branch of the business he may be identified.

Prize Competition for 1907.

COMPETITIONS in house designing have for many years past constituted an interesting feature of *Carpentry and Building*, and at this time we take pleasure in calling attention to the particulars of a prize contest in dwelling houses for 1907, to be managed upon the same general plan as that which has characterized our work along similar lines heretofore. It is suggested that all interested readers, especially those engaged in the practice of architecture, bring this contest to the notice of their friends and acquaintances, to the end that it may be given the widest possible publicity. The presentation of the drawings winning the three cash prizes in the competition will form an important feature of the volume for the coming year.

$500 in Cash Prizes.

Competition XL--$8000 Houses.

The subject which we have selected for the Fortieth Competition is a detached dwelling of modern construction and finish, thoroughly up to date in all its appointments and convenience of arrangement, and which shall not cost more than $8000 in that part of the country from which the drawings are sent. The house may be located, according to preference, upon a corner or inside lot, but the frontage of the site must not exceed 50 feet.

In the construction of the exterior walls of the building it is left optional with the architect to use hollow building blocks, brick or artificial stone, or, if of frame, to cover the outside with siding, shingles, rough cast or a combination of the materials mentioned. The number of stories is also left to the discretion of the architect, the only limitation being that of cost. There must be a cellar under the entire area and the foundations and general construction must be in keeping with a dwelling of the cost indicated.

What is wanted in this contest are houses thoroughly modern in all respects and which, when completed, will serve as good examples of compact arrangement and attractive finish in combination with economy of construction, and shall be fairly worth in the community in which they are designed the amount specified above. Any house which is made to figure $8000 or less by manifest deficiences in construction or finish, or by the omission of important parts, will be rejected.

Drawings.

Contestants are at liberty to send original drawings or to forward those from which houses have already been erected, and where the latter is the case the fact must be so stated. Each contestant may send as many sets of plans as he may wish, all to be subject to the general conditions explained on the last page of this announcement, and which are applicable to all competitions conducted under the auspices of this journal.

In cases where the drawings represent buildings already erected, photographs of the completed structures are desirable, the pictures to measure at least 5 x 7 inches, although 6½ x 8½ inches are preferable. The photographs must be sharp and clear in every detail and well calculated for reproduction as half-tone engravings. We would emphasize the fact, however, that the absence of photographs will not be regarded as prejudicial to the interests of the contestants.

Requirements.

Each set of drawings must include a front elevation, one side elevation (preferably the most attractive one), a foundation or cellar plan, showing divisions, location of heating apparatus, etc.; floor and roof plans, including attic, to-

gether with a good selection of details embracing exterior and interior finish and construction. The sizes of the principal rooms on the different floors must be clearly indicated, the figures to show inside measurements rather than from center to center of walls or partitions.

The elevations and plans may be drawn to any convenient scale, preferably ¼ inch to the foot, and the details may be drawn to any desired scale, from 1½ inches up to 3 inches to the foot. The drawings may be in pencil or ink, upon any good quality of material. Drawings on cloth will be accepted, as will also blue prints; but the lines in all cases must be sharp and unmistakable.

Each study must be accompanied by brief specifications outlining the construction of the building and with indications of the materials to be employed.

There must be a complete specification for the wiring for electric lighting, call bells, &c., and a short description of the system of heating the house.

In each case the author must specify the color scheme of the exterior, naming the colors to be used for the body of the house, the outside trim, the roof, &c.

Detailed Estimate of Cost.

There must also be an estimate of cost in detail under the headings of "Excavation," "Mason Work," "Carpenter Work," including roof; "Plastering," "Painting," "Plumbing and Tinsmith's Work." This estimate must show the **cost in detail** of the work and materials included under each of the above headings; by which is meant that prices per foot, yard or thousand must be given, as well as the rates of wages per day in the various lines. The cost of each in the aggregate must also be stated, including the cost of heating, electrical work, &c. In fact, the estimate must be in detail in the sense in which that word is usually employed in the building business. Any set of drawings not accompanied by such an estimate will not be considered in the award of prizes.

Each estimate must be accompanied by a certificate from some responsible builder that he would be willing to erect the house, or houses, indicated by the drawings and the specifications at the price named in the estimate.

Time.

This competition will be open until the close of business on Thursday, January 31, 1907.

Prizes.

In this competition three cash prizes are offered, to be awarded to the three best sets of drawings submitted in the order of their merit:

First Prize	$250
Second Prize	150
Third Prize	100

Committee of Award.

The decision in this competition will be made by a committee embracing in its composition both builders and architects. It is hoped that the work of the committee will be completed in time to admit of the publication of the design awarded the first prize in the issue of the paper for April.

General Conditions.

This competition is open to the world, subject only to the conditions and limitations set forth. All studies and designs submitted in this contest are to be carefully packed for transportation by mail or express, *without folding or rolling*, and are to be sent prepaid, addressed as follows:

Editor CARPENTRY AND BUILDING,
14 and 16 Park Place,
Entry in Competition No. XL. **NEW YORK CITY.**

The drawings or designs must reach their destination not later than 5 o'clock of the date of expiration given in the announcement. Studies coming to hand later than the stipulated time may receive notice, but will not be considered in the award of prizes.

Names and Addresses.

Each sheet of every study and each sheet of every set of plans and each specification and estimate submitted in this contest must bear upon its face a nom de plume, motto or device by which it can be identified, and the same designating motto or nom de plume must be placed upon a sealed envelope containing the real name and address of the competitor. Several designs or studies may be submitted by one contestant, but in that case each must be designated by a separate nom de plume, motto or device. Each design or study must be complete in itself and bear no reference to any other whatsoever.

Stipulations and Reservations.

The right to return to competitors all the studies submitted in the competition above described without an award of prizes, in case none of the drawings sent in are deemed sufficiently meritorious for publication in the columns of *Carpentry and Building*, is expressly reserved. The right to readvertise this contest or postpone the date of it, in case it should be found necessary so to do, is also reserved. In case designs other than those awarded prizes in this contest are published, due compensation will be made. Contestants are referred to the particulars given in this announcement as being sufficient for all purposes. Since it will, manifestly, be unfair to give one contestant more information than another, all letters of inquiry will be answered by reference to this paragraph.

cedes to the tin roofer more than he has asked; it crushes the malpractice of years in one fell stroke, and with firm grasp uplifts the business to a plane of dignity and honor. As such it enforces co-operation, it demands the support of all manufacturers, of all roofers, of all architects, of all builders.

Cleaning Buildings by the Sand Blast.

An excellent method of treating the façades of stone buildings, which, through the action of the elements during a period of years have become dull and grimy, is the application of the sand blast. By means of it in the cleaning of buildings in the important cities of the country some very interesting architectural effects are being brought out, and the structures restored exteriorly to a close approximation to their original appearance. Materials long since out of fashion are brought out in their pristine freshness, while structures black with the grime and soot of decades of city existence have been converted from the semblance of weather worn granite to spotless white marble, dazzling in its contrast to buildings of similar material which have not felt the cleansing breath of the sand laden air. In many of the cities the cleansing has spread through whole blocks, as property owners have seen the results accomplished on neighboring buildings, and in such instances the transformation is startling. Where an isolated building is uncovered from its mustiness the contrast is not so pleasing, yet the individual building is vastly improved. Architecturally the effect is exceedingly striking, as the designs and materials of years ago are shown as they originally appeared when fresh from the hands of the builders. Some of the sandstones are especially attractive. Doubtless excellent ideas for modern buildings will be suggested to the architects. In one of the smaller cities of the East a nine-story building, 140 feet in hight, built only a few years, has had its white Georgia marble turned from a sooty gray to snowy white. The expense of the work does not appear to be excessive, and an old building must obviously increase in rentable value with its greater attractiveness of exterior.

San Francisco Reconstruction Work.

The reconstruction of the big steel frame buildings damaged in the late big fire is about the most important work going on at present in San Francisco. On November 7 a permit was taken out for the repair of the St. Francis Hotel at a cost of $500,000 and the work on this building is already well under way. The Fairmount Hotel, which was not fully fireproof at the time of the fire, is now being fully protected. The Hibernia Bank Building is being provided with a new dome and arrangements are being made to replace the damaged stone columns. The twelve-story Mutual Savings Bank Building has been refaced with stone, the stone cornice over the ninth floor is now being replaced and the interior is being decorated. The replacing of the stone facing on the walls of the Shreve Building is nearly completed and the building is already partially occupied. At the Crocker Building new concrete floors are being laid, the damaged hollow tiling on the interior is being repaired and the window arches on the upper floors are being replaced. Five stories of the Union Trust Building are being used and the remainder of the building will be repaired in a few weeks. The Spreckles Building is being remodeled and repaired. The fire damaged stonework about the windows of the James Flood Building has been replaced on the upper floors, the terra cotta partitions throughout the building are nearly all replaced and the four upper floors are replastered and practically ready for occupancy. The Southern Pacific Company is to have possession of the fifth and eleventh floors of the James Flood Building by November 15 and of the whole building by January 1. The stripping off of the brick work from the side walls of the Merchants' Exchange Building has been completed and most of the damaged stonework on the front wall has been replaced.

Two of the big steel frame buildings which were supposed to be fireproof will have to be taken down. These are the Mills Building on which no work has yet been done and the Mutual Life Building which is now being torn down. The latter was the finest building in the West at the time it was built and was the first really modern building erected in this city.

Of the buildings under construction at the time of the fire, practically none were seriously damaged and all are now rapidly nearing completion. The 10-story Newman & Levinson Building has been inclosed and the stone facing is nearly completed. The Marston Building has been faced with pressed brick and is now ready for the interior finishing. Eight concrete floors have been laid in the sixteen-story Whittell Building though the walls are not yet up. In the Monadnock Building 400 rooms are now occupied and the ground floor is to be occupied before the end of November. The frame of the new wing of the Monadnock is now being riveted.

Convention of Brick Manufacturers' Association.

An official announcement has been made by the Executive Committee of the National Brick Manufacturers' Association to the effect that the twenty-first annual convention will be held in the city of St. Louis, Mo., February 4 to 9, inclusive. As in former years, there will be a series of joint conventions. The American Ceramic Association will begin the week with sessions Monday and Tuesday and closing Wednesday afternoon. The National Paving Brick Manufacturers' Association will hold its sessions during the same days. The National Brick Manufacturers' Association will hold its first session Wednesday afternoon and follow with one session each on Thursday and Friday forenoon, leaving the afternoons of those days for the inspection of clay plants and such other sightseeing as visitors may elect. Those desiring information as to the requisites of membership, plans for exhibition of clay products, &c., can secure it by communicating with Secretary Theodore A. Randall, Indianapolis, Ind.

New Stock Exchange Building.

The movement looking to the erection of a new home for the New York Consolidated Stock Exchange has taken definite shape in the filing of the plans with the Bureau of Buildings for the Borough of Manhattan. The new structure will occupy a site at the southeast corner of Broad and Beaver streets, on which it will have a frontage of 99 ft. and a depth of 126½ ft. It will be four stories in hight, constructed of brick, trimmed with granite and terra cotta, fashioned after the design of a classic Greek temple, with porches having Ionic colonades with pediments and crowned by a great dome. The architects, Clinton & Russell, estimate the cost at $250,000. The basement will be fitted up as a restaurant, and the three stories above the main exchange floor will be devoted respectively to the clearing house department, the officers' rooms and the board room.

Convention of New York State Association of Builders.

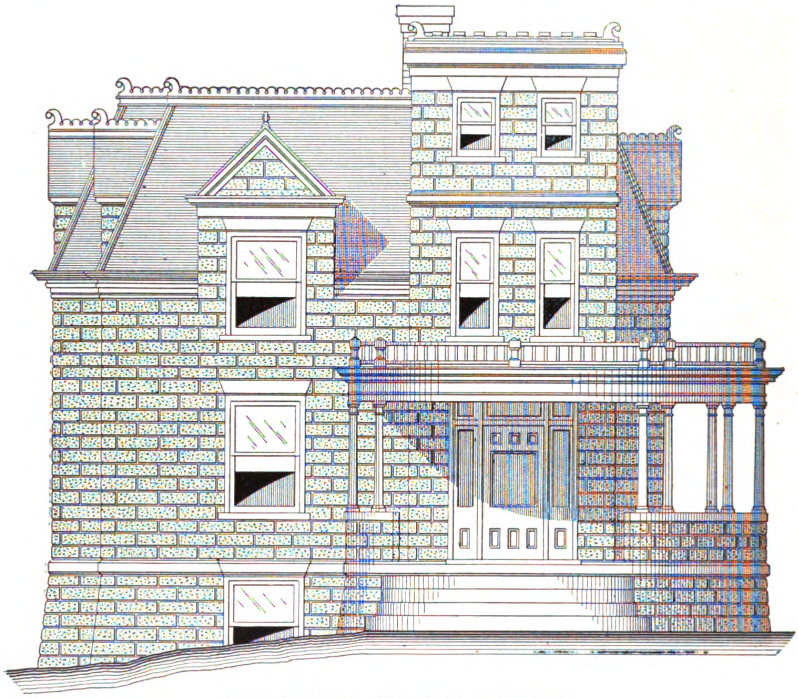
Secretary James M. Carter advises us that the next meeting of the New York State Association of Builders will be held in the City Assembly Chamber, Elmira, on January 23, 1907. The details connected with the arrangements for the convention will be in the hands of Ruben Thurston, who is secretary of the Elmira Builders' Exchange.

THE new 12½-story hotel, which is rapidly nearing completion at the corner of Madison avenue and Forty-ninth street, New York City, has a façade of limestone in the two lower stories and red brick with terra cotta trimmings above. The structure, of which Herbert Lucas is the architect, occupies a plot 75 x 80 ft., and its completion marks the end of a long building operation.

CORRESPONDENCE.

A Cottage of Concrete Veneer.

From L. H. H., *Vincennes, Ind.*—In looking over recent issues of the paper, permit me to say that they are especially fine. Hospital buildings, stables and three-family flat buildings are just what we need. Houses, cottages, &c., have been so thoroughly discussed that anything out of the common comes in like an election cigar. I send under separate cover drawings of a veneered house, which is rather unique. It is, in fact, a frame house veneered with concrete blocks and has concrete steps leading to the veranda. The floor plans show the general arrangement so clearly that very little comment is necessary, but I shall be glad to answer any questions that the readers my present through this department of the paper. As being of general interest in this connection I would state that the contract price of the concrete work was $729, and that the cost of the house complete with plumbing, heating, &c., was $2,794.



Front Elevation.—Scale, 1/8 In. to the Foot.

A Cottage of Concrete Veneer.

While writing, I desire to express the wish that we might have a competition in church plans, and as a starter I will furnish a floor plan, if agreeable. I think nothing would add so much to the paper as a discussion of church, school and factory construction.

Note.—We shall be very glad to have our correspondent furnish the drawing in question and to have the readers start a discussion on the subjects indicated. They offer an excellent field for an expression of opinion on the part of those practically engaged in the building business, and we have no doubt that much valuable information would be brought out by a full and free consideration of these topics.

Fir, Spruce and Hemlock for Interior Finish.

From E. S. Crull, *Sedalia, Mo.*—I have just been reading the extracts published in the current issue of *Carpentry and Building* from the worthy paper read by N. J. Blagen.

It should be remembered that Mr. Blagen's paper was read before an audience perfectly familiar with the virtues of fir and spruce as in general use, and his object was to call their attention to the beauty and increased usefulness as a substitute for high priced imported woods, rather than to instruct them in the uses with which they were more or less in touch, hence his paper did not do justice to either in making the Eastern reader acquainted with them, as your publishing intended. It is rather surprising that Mr. Blagen should say of fir, "I am perfectly satisfied that fir is one of the best lasting woods that can be found, especially where it is not exposed to the elements," considering the fact that it is the principal outside structural wood of the Pacific Coast, and has grown into such indisputable favor in the Middle West that it is the principal reliance for bridges, next with oak, stock watering tanks (often half buried in earth), windmill towers, and by the railroads for cars, &c. It has been used to such a largely increasing extent for flooring porches during the past 15 or more years that it is a strange thing to have a call for any other wood for that purpose. Spruce is ranking with fir in this demand, and where both are on sale there is little discrimination between them in the buying, spruce having the preference with some carpenters, fir with others.

I want to write of Washington spruce in particular, though Mr. Blagen has pretty well covered the subject as to interior finish and doors, except that he does not apply it to furniture, the crafts, pattern making (where it is gradually creeping into use) and in the manufacture of musical instruments. Piano and organ makers were quick to take it up and are becoming large users.

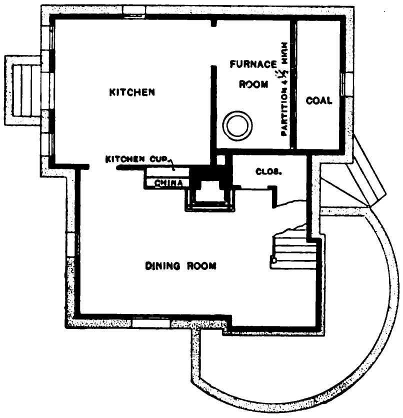
Spruce is susceptible of a high and beautiful finish, either in natural color or stains.

Aside from being so nearly like white pine in texture and lasting it is the perfect substitute for it in color, and for all uses of what is termed "uppers" for exterior purposes; it is especially suitable as siding, cornice and outside finish, door and window jambs, moldings, battens and wagon box sides.

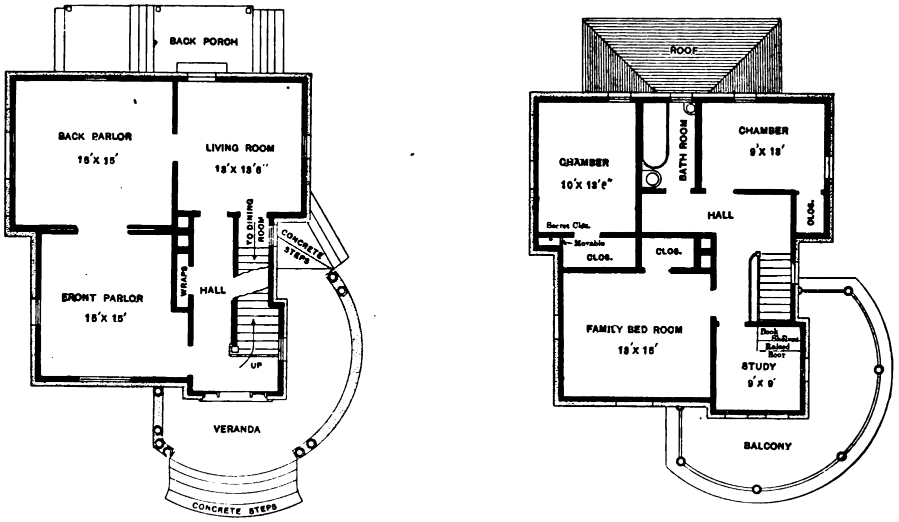
Though spruce works harder and is harder on the cutting edges of tools than white pine, and there exists a decided prejudice because of that, the quality and perfection tend to overcome this slight objection, which of course is due altogether to the carpenters and not the one who pays the bills and would preferably order spruce if fully advised.

As an old-time Yankee contractor of the old school said, after his first experience with it: "It is the first lumber I ever saw that a full carload could be used without so much as an inch of waste, yet my carpenters are so prejudiced in favor of white pine they purposely or recklessly damage the spruce in nailing it, as an excuse for condemning it."

This writer of this has preferably and most satisfactorily used spruce doors, siding and finish, during the last 15 years, and believes it is more lasting, holds paint better and has fewer faults once in place than any wood for these purposes at present available.



Basement.



Main Floor. Second Floor.

A Cottage of Concrete Veneer.—Floor Plans.—Scale, 1-16 *In. to the Foot.*

Spruce is free from swell and shrink, checks shake and sap to a larger extent and does not warp or split in nailing more than does white pine of the same grain texture; in fact the manufacturers of spruce doors will warrant them more strongly against failure from any cause than they will any other wood.

Nowhere can such desirable widths of clear, white lumber be had as that supplied from the Washington spruce trees. At the St. Louis Exposition there was exhibited in the Washington State and Forestry buildings spruce boards almost 10 ft. wide that were still wet from the water that had floated the log to the mill when they reached St. Louis. They were dressed on one side by hand after arrival and treated to a varnish finish. They remained throughout the Exposition, drying in the meantime, and afterward one was sent to Portland; the other after being shipped by local freight to two State fairs is now on private exhibition, and yet the perfect condition they were in at St. Louis has not changed. There is not a check nor warp in them not there when first finished.

Another board 7 ft. wide has stood continuously exposed to the rigors of the Middle West elements for five years without other than three or four quite small heart checks in a space not over 4 in. wide and less than 1½ in. of warp in the 7 ft.; not a single end check in the piece.

If there is any doubt as to the lasting of spruce inside or out it is conclusively refuted in my experience.

The introduction of a new and unknown article is necessarily educational; it is such a common fault to get into ruts and refuse to come out until lifted bodily. To attain success it is necessary to be alert in progressive ideas, discarding any method or article as soon as a better is known, satisfying a customer rather than retaining outclassed notions because of the effort (often slight) necessary in changing.

Condemnation is such a convenient cloak for ignorance that it is frequently used; when there is failure in a part it is easier to attribute it to some item that is little known than to search the truth—less disturbing to slur the material than discuss the workmanship.

A pertinent example of this came about through a carpenter bitterly condemning some spruce siding that he had placed (perhaps the first he had ever seen), saying it had split badly, frequently from one end of the piece to the other after being nailed in place. Of course there was a reason for it, but for the carpenter there could be no other than that the spruce siding was worthless for the purpose. Investigation (not made by the carpenter) developed the use of green yellow pine sheathing 10 in. wide laid parallel with the siding. Certainly the siding split over one of those shrinking sheathing joints, and certainly, too, any one should have known that, but the sheathing was not in evidence as was the siding, therefore the siding was "caught," and served it right for being in such company.

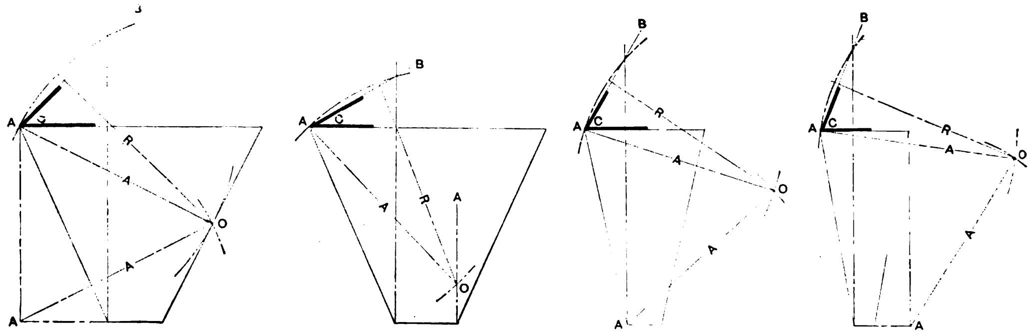
It is within the recollection of the writer when the building material of Indiana, Ohio and the neighboring States consisted entirely of the woods native to those States. Poplar only was deemed worthy or suitable for such items of construction as doors, sash and the frames for same; siding, inside and outside finish; though it was an established fact that poplar windows and doors could scarcely be opened during damp seasons except strenuous and damaging methods were employed, and the temper usually "went to pieces," ofttimes sulphurous pieces.

In dry weather it was necessary to do some wondrous calking to prevent distracting rattle and draughts.

The opinion of worthiness as to lasting was well taken, for a good quality of yellow poplar made into siding or shingles (the shingles rived and shaved by hand) was unquestionably lasting, yet the main secret of its common use in the beginning was probably not more the lasting qualities than the softness and ease in working.

When poplar began failing in supply and white pine to replace it there was that universal prejudice to contend with, never wholly eliminated to this day; and again, when yellow pine of the South came hesitatingly into the Northern markets it was unceremoniously relegated to the refuse pile as unfit for any purpose. It has encountered such opposition for more than 20 years, but is at last independent of accusers and in position to dictate its price.

Almost simultaneous with the advent of yellow pine came the opening of the Washington and Oregon lumber markets through the building of the Great Northern Railroad, principally in the beginning, with their wonderful wide and clear red cedar shingles, than which no more needed article was ever more derided, slurred and denied, yet their appearance in the markets at the time of their introduction was most timely and the coming opportune, for other sources of supply were fast being exhausted; but prejudice as to shingles has almost wholly disappeared, as prejudice is certain to do when necessity forces it to the brink.



Bevel Cuts for Hoppers.—Submitted by C. A. Wagner.

The strangeness in all this prejudice as regards building material is that it rests principally with those who are regarded as expert in opinion, the ones who should advise themselves more thoroughly before attempting to advise others.

As carpenters in country districts and architects in the populated localities are the advisors of their patrons who so largely depend on them they should cast all prejudice aside and investigate the merits and advantages most to the benefit of their patrons. Prejudice is but another name for stubborn egotism.

Bevel Cuts for Hoppers.

From C. A. Wagner, *Port Jervis, N. Y.*—Inclosed I am sending a chart showing layout of bevel cuts only of hoppers, as the side cuts are very simple. This chart can be readily figured out by any ambitious carpenter. The rule by "R. W. McD." is very good, but it is too complicated for most readers to understand, while I claim my rule is very simple. It is of my own design and I am convinced it is entirely accurate, as I have built hoppers by the use of it.

I will wait for the other readers to submit a rule for the side cuts. These are, as I have said, very simple, and if there is not something forthcoming in the near future from the readers, I shall give my rule, but not just at present.

While the inclosed chart is of my own figuring I may not be the only one using the rule. I would state, however, that it will answer for any desired slant, but always take the length of the side bevel cut for the radius points and then proceed as indicated by the chart. This relates, however, only to miters.

Referring to the diagrams, O O are the center points for radii of bevel cuts obtained from the points A A, which in turn are bisected for the purpose of obtaining the radii points as indicated by the broken lines. The distances in all cases from A to O are equal to the length of the side bevel cut of bevels. The lines E R represent the lines of radii intersecting the bevel points for the required angle for the bevel cuts of hoppers. The dotted or broken lines are only for the purpose of establishing the points of intersection. The proper bevel cuts are represented by C C C C. Fig. 1 is the diagram for a square bevel, Fig. 2 for an equilateral, Fig. 3 for a hexagon, and Fig. 4 for an octagon.

Admirable Suggestions for Improving the Correspondence Department.

From R. W. M., *Uniontown, Pa.*—I wish to say that *Carpentry and Building* is good, unquestionably good, and has been greatly improved right through in the last few years. But there is one way in which it might be made better if the readers will do their part, and this is in the Correspondence Department. Not that the Correspondence Department as it stands now is not good, for it is good; one of the most interesting parts of the paper; but why not make it better by making more of it? This is not a suggestion to the Editor, as we are all very well aware that he cannot print more in the Correspondence Department unless he gets the correspondence. And this is just the point, there should be more correspondence.

Every reader of the paper certainly has some ideas that would be of benefit to the other readers, or, what is just as good, has something he would like to know which he can inquire about through the columns of the paper, and which will be sure in every case to bring out replies.

It may be that I am taking too much on myself in making these suggestions, but from the manner in which such matters as I have sent, in the last few months, has been received, I believe that all contributions are welcome. A discussion of matters of general interest to the trade are bound to be of benefit to all readers, not only those who are concerned in the discussion, but also those who are following it up. The interchange of ideas of practical men is bound to be of great general interest and value.

As an instance of this I would like to say that previous to subscribing to *Carpentry and Building* last year the only numbers I had read were bound volumes for 1879, 1880 and 1882, with most of the numbers for 1883. In the latter part of the volume for 1879 an article appeared entitled "Some Problems in Framing," or rather a series of articles, for it ran through several numbers. In this article the framing of a tank tower was completely and minutely discussed, and led to the contribution of a rule for backing hip rafters by a correspondent. This rule, or, rather, some portions of it, were condemned by several correspondents, and the discussion which followed in the Correspondence Department ran all through the volume for 1880, bringing out letters from practical men covering every imaginable point in ordinary roof framing, with a very large number of diagrams.

Now just this one volume would be of more value to

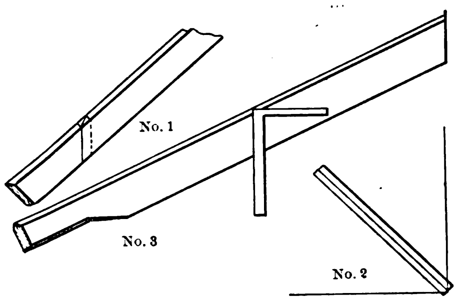
a young mechanic (as well as some of the older ones) than several books on the subject. Eighteen hundred and eighty is a good while back, but at the same time the methods and principles given in that old volume are just as sound, simple and applicable to-day as they were then.

One thing that brought out so many points in the correspondence alluded to was the fact that such a large number of the readers took part on one side or the other, thus bringing out the ideas of a great many instead of a few. Now this can be done as well to-day as at that time, and while I am not asking that this department be given over to a prolonged argument about roof framing or any other subject, yet at the same time I believe it would be of value if everyone would give the other readers the benefit of their ideas, and when anything of this kind comes up let no one hesitate to contribute what ideas he may have on the subject. In this way many methods and ideas will be given to the readers of the paper which otherwise would be unknown to them, and would be sure to be of great interest and practical value to a great number, if not all. The fact that there may be methods of performing some particular operation which may be an old story to many readers should not stop a correspondent from describing his method, as it will most likely to new to many other readers.

I do not want to take up a lot of valuable space with my views on this subject, nor to appear to want to criticise or give advice, but I cannot help thinking that it would be a good thing if more of the readers would devote a little time to an occasional letter to this department and give the rest of us the benefit of their ideas and experience. For my part I have not the experience of the majority of the readers, but what little I can offer that I consider of any value whatever I am glad to contribute. I sent a description and plans for a tool chest a few months ago, which happened to be what another correspondent wanted, so that I felt amply repaid for the little time it took to write the description and make copies of the original plans. While this was probably of interest to only the one reader, yet there are many subjects that could be discussed which would be of great interest and value to many. Therefore, I say let us have more contributions from the readers in general.

I hope I have not gone too far or overstepped the limit in the way of suggestions in this letter, as that was not the intention; but I really would like to see some more of the readers take a practical interest in this department.

Note.—We consider the suggestion of our correspondent an admirable one, and we trust that the practical readers having the welfare of the paper at heart will do their share in making successful the scheme described by "R. W. M." and during the long winter evenings now at hand improve the opportunity by sending us at least one letter for publication in the Correspondence Department. The problems which are constantly arising in every day practice afford ample opportunity for interesting and valuable discussions and no one should hesitate in furnishing the Editor with a full and free expression of opinion regarding any phase of the building business in which the writer may be interested. All are invited to participate.



Bevels of Hip and Valley Rafters.

Bevels of Hip and Valley Rafters.

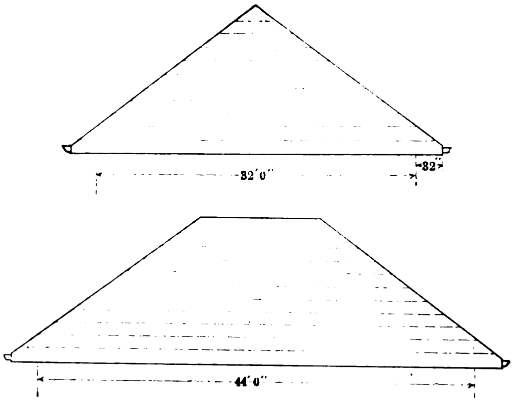
From A. READER, *Holderness, N. H.*—The correspondent signing himself "C. C. H.," Brookville, Pa., asks for a simple way to lay out the bevels of a hip rafter, and in reply I send a few reliable rules which will, I believe, cover the cuts and bevels on an ordinary roof. Referring to the sketches sent herewith, No. 1 shows a joist 2 x 6 struck for jack rafter. The down bevel or plumb cut is the same as for a common rafter. After getting the down cut with the steel square or rule, get the exact thickness of the joist you are working and place the rule at right angles with the plumb cut. Supposing the joist to be 2 in. thick; lay out 2 in. and draw a line parallel with the one you already have. Square across the top and draw a line diagonally to intersect the two points; set the bevel on the top and you have it, as shown.

Now, for the hip or valley, we get the bevel in the same way. Lay out the work with the steel square on the rafter after the same manner as the jack, always remembering that the down cut of the hip or valley is different from the jack or common rafter, consequently the bevel will be different, although you get it in the same way. Care should be taken to always work from the center of the rafter in all cases, and in laying out allow for backing.

No. 2 of sketches will hardly need description, but we will suppose it to be a hip rafter 3 in. thick. Gauge a line in the center on top which will be 1½ in. to the center. Now take the steel square and lay the blade on the plumb cut as in No. 3. With the knife point or sharp pencil make a fine mark 1½ in. on the tongue or half the thickness of the rafter and set the gauge. We now have the bevels for the hip or valley complete. Although there are several rules which may perhaps be more rapid than those described I know of none more simple, but would like very much indeed to have the boys relate their experience along these lines.

Estimating Roof Construction.

From J. A. K., *Detroit, Mich.*—I would like to have my brother mechanics tell me through the Correspondence columns of the paper how to find the area of a roof estimating from an architect's plans. I enclose sketches showing elevations of such a roof, and what I wish to know is the practical way of finding the lengths and amount of the rafters, the number of feet of roofing boards necessary, and the number of shingles required in a roof of this kind; also how is the pitch of a roof determined from the plans. I hope that the brother readers will be interested and give me their opinions, not only for my sake, but also for the benefit of others, for I assume there are many of them who are readers of the paper.

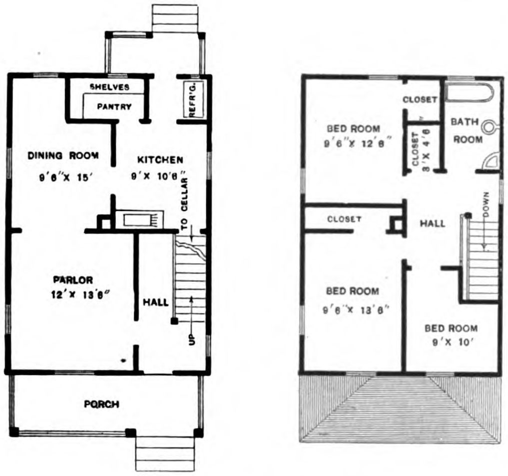


Estimating Roof Construction.

Value of Carpentry and Building to Young Mechanics.

From G. J., *Cooperburg, Pa.*—One more number and I have received your valuable journal, *Carpentry and Building*, for 23 years. All of them, with the exception of two or three numbers which I lost by loaning them to people

intending to build, I have in my library. Noting the pile of books they make and thinking of what a vast amount of information they contain, and how much more I might have learned from them, moves me to do something to encourage the reading of your journal, especially by beginners, who may have taken it for a year or two and now perhaps have concluded to drop it, thinking it not worth the time and money, or perhaps through negligence may not have renewed their subscriptions. Should there be any having such ideas, and these comments come under their notice, I would say to them, "You can make no better investment with a dollar and in no other way can you received such an amount of information for so small a sum of money. If you will go to work and read its columns carefully, study the different problems contained in its pages regularly from month to month, I am sure you will not part with it." I could have learned a great deal more from its pages, but as I worked more than half of the 23 years in a sash factory, much of the correspondence was not of special interest to me.



Floor Plans for Small Cottage.

It is, however, through *Carpentry and Building* that I learned to make drawings, and when I was in need of tracings and blue prints in order to progress in my labors and not knowing where to go for information or to learn how to do it, there came to my rescue an article in the Correspondence Department telling me how to make them. Since then I have prepared many plans for building houses ranging in cost from $1200 to $6000, the information gleaned from the columns of the paper paying me many times over for the money I expended for subscription to it.

I often look through the different volumes for designs of houses for my customers, but none of them seem to exactly suit. However, as I make very few plans that would suit a second customer without at least some alterations, so the above would be no excuse for dropping my subscription, for when I want an idea for a different cornice or dormer or tower window, gable, porch, bracket or a new idea of a stairway or possibly a roof truss, &c., I look through the different copies of the paper which I have, and which for the most part are bound in book form, and I have never been disappointed, as I could always find something which would afford a suggestion or give an idea, so that I could work out what I wanted.

If one desires to learn the different ways of doing work in the different sections of the country, *Carpentry and Building* is the book from which to learn it, so when you go from home to your work you go equipped not only with the ideas you have learned at home, but you have the best and most practical methods derived from the experience of mechanics all over the country, if you make it a point to carefully study all that appears in the columns of the paper.

In conclusion, I want to say to the young men of the country, "Take my advice and keep *Carpentry and Building*. I have tried other papers, but have so far found this the best. Study it carefully and try to improve by it all you can, and I am sure you will never regret it."

Floor Plans for Small Cottage.

From L. R. G., *Waukegan, Ill.*—In a recent number of *Carpentry and Building*, "H. V.," Chicago, Ill., asks for floor plans for a small cottage about 20 ft. wide by 30 ft. deep. I think I have just about what he wants and submit herewith plans of first and second floors. I do not just understand what he means by the "roof should be one-half from 14-ft. studding," but if he wants elevations I will gladly furnish them.

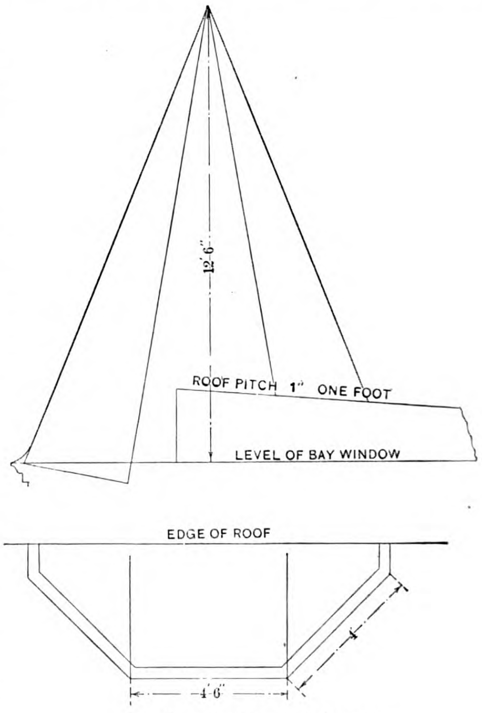
Note.—We are under the impression that our correspondent intended to convey the idea that the roof should be of half pitch and the walls of the cottage should have 14-ft. studding.

Framing an Octagonal Tower.

From R. A. H. P., *New York City.*—I inclose sketch of a tower which I recently had to construct and in connection with which I experienced some trouble in finding the points for the foot of the rafters on the roof. The tower was built over a bay window, half of the tower being on the main roof of the building, which had a pitch of 1 in. to the ft. The bay window was built up to within 2 ft. of the main roof. I would like to know some quick and practical way of finding the exact points for the rafters of the roof.

Zinc Ornaments for Wooden Buildings.

From T. F., *Cincinnati, Ohio.*—A contract has recently been let in this city for the construction of a number of wooden houses which are to have zinc or copper ornaments nailed to the woodwork. The reason for using metal on wood is that a more ornate design can be secured at a less expense, but the contractor insists that they shall be nailed with copper nails. I do not think this is necessary and believe it would be positively injurious, because I can readily see where a galvanic action would be set up at certain times, owing to the juxtaposition of zinc and copper. On the other hand, I believe



Framing an Octagonal Tower.

that a galvanized iron or tinned iron nail will work satisfactorily, as the ornaments will have to be painted.

Calculating Board Measure Mentally.

From HEE H. SEE, *Brockville, Ont.*—I have noted with interest the short article on the above subject printed in the October issue and I must confess that I do not think very much of it. I do quite a little lumber measuring one way and another, and the method I have found to best satisfy my requirements is what is known as "cancellation." In this method all the numbers which are to be multiplied together are placed above a line and the numbers that are to be divided into them are placed below it (in calculating board measure the number to be placed below the line is always 12), after which any number on one side of the line which can be divided into any number on the other side is cancelled. The operation of this rule will be best shown by an example, and for this we will take the one in the article above referred to—that is a stick 2 x 4 and 14 ft. long. It will work out thus:

$$\frac{2 \times \cancel{4} \times 14}{\underset{3}{\cancel{12}}} = \frac{28}{3} = 9\tfrac{1}{3} \text{ ft.}$$

In this we say 4 into 12 goes 3 times; cancel the 4, also the 12, and place a 3 under the 12. As it is not possible in this simple problem to cancel any more we multiply 2 x 14, which gives 28, and divide that by 3 gives 9 and 1 over, or 9 1-3 ft.

The capabilities of this rule are not shown in their true light by the above example, because strange as it may seem the larger the number of pieces involved in the problem the easier it is to solve it. For instance, suppose there were six pieces of 2 in. x 4 in. x 14 ft., the sum would then run this way:

$$\frac{\cancel{6} \times \cancel{2} \times 4 \times 14}{\underset{\cancel{2}}{\cancel{12}}} = 56 \text{ ft. B.M.}$$

Here we simply say 6 into 12 goes 2 times; cancel the 6, and the 12, place the 2 below the latter; then the 2 below the line will cancel the 2 above the line. Striking them both out, all that is left to do is to multiply 14 x 4, which equals 56 ft. Once this method is understood sums can be done mentally by it which are surprising to those not "in the know." When the lumber is 12 ft. long leave out the length and just multiply together the other dimensions, which will give the answer in B. M. feet, as follows: 4 pieces 3 x 11 x 12 amounts to

$$\frac{4 \times 3 \times 11 \times \cancel{12}}{\cancel{12}} = 132 \text{ ft. B.M.}$$

Any further information concerning this method which the readers may desire will be gladly given by me.

How Shall a Church Be Ventilated?

From H. A. B., *Brooklyn.*—I have read the letter of "W. C." in the November issue, and regret that he did not give more information as to the size of the building, or more particularly what method of heating is employed. I assume, however, from the fact that it is a small church that it is heated with stoves, and consequently there is necessity of some change of air in the building. If air is to be taken from the church some provision must be made for air to come into it. This possibly can be readily done by means of registers placed underneath the stoves, so that the air coming in will be warmed and not interfere with the comfort of the audience, so far as temperature is concerned.

Taking the air out brings up the question whether it is desirable for it to be taken from near the ceiling or near the floor. Possibly it would be best to provide some means of taking the air from both the floor and the ceiling and so arranged that it can be taken from either place at will. This may necessitate building out into the audience room of an ornamental sheet metal flue led up into the attic space at some point where the outlet can be finally provided without inconvenience. If there is a tower on the church it would seem as if there ought to be some means of utilizing it to take air out of the attic space. If this cannot be done it should not be difficult for any architectural sheet metal worker to design some sort of a ventilator to be placed on the ridge of the roof opposite to the tower, or at some point which will not detract from the general architectural style of the building. This can be made either round or rectangular with louvers and it can be arranged with a damper so that chains running from the damper to the audience room can control it to leave it open or closed as may be desired.

The catalogues of a number of the manufacturers of architectural sheet metal work contain suggestions for just such ventilating apparatus. The size of the ventilating outlets from the audience room will be governed by the size of the audience and the size of the air supply. The velocity in such a flue would vary with the wind, but could be regulated by the damper. If the flue were made 18 x 24 in. in cross section and had a velocity of 4 ft. per second it would exhaust 720 cu. ft. of air per minute, or 43,200 cu. ft. per hour. This would be enough to give three changes of air per hour in a church 25 x 40 x 15 ft. in size, or containing 15,000 cu. ft. The calculation is 3 (flue area) × 4 (velocity) = 12 (air per second); 12 × 60 (seconds) = 720 (air per minute); 720 × 60 (minutes) = 43,200 (air per hour); 43,200 ÷ 15,000 = about 3 changes per hour.

Plan Wanted for Butler's Pantry.

From W. W. S., *Brockton.*—Will some reader of the paper kindly furnish me a plan of a butler's pantry, also tell me if it will do to plaster directly onto hollow cement blocks without lathing?

Note.—If our correspondent will refer to the August issue of the paper for the current year he will find an article on the arrangement of kitchens and pantries, illustrated by means of eight plans, showing kitchen and adjoining pantry, which possibly may answer his purpose.

In regard to his second question, we would say that it is common practice to plaster directly on hollow cement blocks without the use of lathing.

Building Methods in England.

From W. J. BLACKMUR, *Manor Park, England.*—I have noticed the long letter of Mr. Macdonald in the October issue of *Carpentry and Building* criticising my article, morals and nationality, and am free to say that he did not display the argumentative ability generally conceded to the Scots. After his rather strange way of extolling America and proving that the country is running well, he says he has never handled a white fir in Scotland even in tenement houses, but they are used in Scotland by builders who are not working to architect's specifications. Scotchmen are too canny not to buy the cheapest joists. There is a difference of about 30s. per std. between white and yellow, and to imagine a Scotchman cheerfully paying this difference is against human nature.

He resents my remarks about the East End of London. Any one who knows that particular locality will agree that those houses do not come up to modern requirements. They are hideous, and I did not say all I think about them; in fact, my language was quite gentle to what I could have truthfully said. The keen-witted Yankee who does not wake up in the middle of the night to laugh at a joke told the week previous, will have seen that the article did not touch upon the building trade in general, but only a section. No slur was ever intended against the good craftsman, but just a quiet bit of fun at the speculative builder who is so eager after the big shilling. Mr. Macdonald's best point is left until the last and it is very amusing. He should have allowed his Scot caution to have fuller play.

Deadening a Ceiling.

From C. A. W., *Port Jervis, N. Y.*—In answer to "J. M. B.," Monroeton, Pa., will say that if he will use the common plaster boards which are to be had 32 x 36 in. in size and cost 12 and 14 cents a piece he will have a good effective deadener of sound. He may have to put on one or two, or possibly three layers with air spaces between. I have used these with good results. They do not require a very large outlay of money, as each piece covers 8 sq. ft. of surface.

New Rule for Concrete Construction.

One of the questions connected with the introduction of concrete systems of construction into more or less general use in this country has to do with the choice of the trade whose province it will be to erect buildings of this sort and the wages that will be paid for doing it. In the past it has been reckoned by the advocates of particular methods of using concrete for structural forms that it was cheaper than brickwork, and as enduring, and a stated reason for this was that on account of its simplicity ordinary labor could perform most of the work and it was not necessary to pay the wages required in skilled trades. Suddenly the mason and bricklaying trades, perceiving the importance which concrete work had taken on in the metropolitan district, says the *Record and Guide*, and foreseeing a certain competition which it would set up with granite, marble, stone and brick, demanded from general contractors that their trade should have the exclusive right to execute all forms of concrete construction and be paid for it at rates now prevailing and recognized by the mason and bricklaying unions.

In other words, if apartment houses, warehouses, factories and garages were to be built with concrete walls instead of brick walls, and armored concrete floors and partitions instead of terra cotta floors and partitions, they would insist, with all the power and influence at their command on doing the work; and they are the most powerful body of mechanics in the city, whose final word has ever been law in any contention between masters and journeymen. The mason builders of this city have never been able to bid defiance to their masons and bricklayers, though the latter affirm that they never strike, leaving the public to infer that their points are gained by the self-evident justice of their cause, by the eloquence of their oratory, or the soundness of their logic, though on one or two occasions certain large contractors have discerned on the horizon something having the form and appearance of what in other trades is generally termed a strike.

With the same wages paid for concrete work as for stone and brick work, there would be less reason for concrete and its field of employment would be restricted; and cement, instead of stepping into the place of a primary building material on the same social level as wood, granite, stone, brick, iron and marble, would be kept back in a secondary position, along with lime, sand, gravel and paint. Other cities might do as they would, but as for New York it would not have cement taking the place of marble, brick and cut stone and trying to imitate them without paying the same wages. On that determination the bricklayers and masons stood for several weeks, causing much anxiety to the cement interests; but with continuance of the negotiations and discussions over the question, which still continue, the representatives of the journeymen have modified their claims. After reflection they concluded that there are some parts of concrete work they do not fancy, as, for instance, the wheeling and pouring of the mixture into the forms arranged to receive it; this they would leave to men who could do nothing better. But upon one thing they will ever insist, they tell their employers, and it is that concrete structures, to gain exemption from the schedules of the skilled trades, must be built all of concrete, or, more properly, reinforced concrete and stand before the world for what they are. They cannot be veneered with a 4-in. wall of handsome brickwork to make them appear more costly than they really are; they must be one thing or the other. No union bricklayer will help build a brick veneer for a concrete wall; he will not help to build a structure part of brick laid by first-class mechanics and part of concrete poured in by laborers. He and his fellows will not otherwise shut the metropolitan door against concrete, or set their faces against architectural progress, but architects and engineers must let the new material stand for what it is and not as an imitation of stately brick and marble, mosaic, tile or stone.

The last chapter in the peaceable negotiations between the mason builders and their journeymen is some distance away, but upon this one rule, if upon no other, the mason and bricklaying trade has taken its stand irrevocably, as we are authoritatively informed; and who will say it is not logically right in so maintaining? Our engineers have learned how to make concrete strong; let our architects now learn how to make it beautiful.

◆

Effect of Moisture on the Strength and Stiffness of Wood.

Very little is definitely known about the influence of moisture on the strength of wood, even by those experienced in handling the material. Since the whole subject is one of great importance, the Forest Service has been making a thorough study of it during the past three years and is about to publish the results of its investigation in an exhaustive technical bulletin entitled "Effect of Moisture Upon the Strength and Stiffness of Wood."

The chief points presented by the study are:

1. The relation of moisture to strength follows a definite law which can be graphically expressed. Proper drying very greatly increases the strength of all kinds of wood, the amount of increase in strength depending upon the species and the dryness. The increased strength given to green wood by thoroughly drying it is so great that it will surprise many. For example, the strength of a piece of unseasoned red spruce may be increased over 400 per cent. by a thorough drying at the temperature of boiling water. Strength decreases again, however, as the wood reabsorbs moisture. Air dried wood, protected from the weather, and containing 12 per cent. of moisture, is from 1.7 to 2.4 times stronger than when green, varying with the species. Stiffness is also increased by drying. These conclusions, however, are drawn from small sized pieces not exceeding 4 x 4 in. in cross section, such as are used in vehicle work, tools, &c. Large timbers require years of drying before the moisture is reduced to the point where strength begins to increase. It must also be taken into consideration that more or less checking always occurs when large timbers dry; and if this checking is excessive it may cause weakness to counterbalance, partially or entirely, the strength gained in drying. Consequently it is not safe to assume that the average strength of large, so-called seasoned timbers is much greater than that of green or wet ones.

2. The fiber saturation point of a number of species has been determined. This point, which varies with conditions and species of wood, designates the percentage of water which will saturate the fibers of the wood. It has been found that, under normal conditions, wood fiber will absorb a definite amount of moisture; beyond this the water simply fills the pores of the wood like honey in honeycomb. Only that water which permeates the wood fiber has an influence upon the strength. For the following species the saturation point occurs at the given percentage of moisture based on the dry weight of the wood:

	Per cent. moisture.
Longleaf pine	25
Red spruce	31
Chestnut	25
Loblolly pine sapwood	24
Red gum	25
Red fir	23
White ash	20.5
Norway pine	30
Western tamarack	30

3. Prolonged soaking in cold water does not reduce the strength of green wood below that of its fiber saturation point, provided it remains in perfect condition. When wood has been dried and is resoaked, it becomes slightly weaker than when green.

4. Wood soaked in heated water absorbs more moisture because the amount of water which the fiber will contain is increased. This causes a reduction in strength and stiffness, as in wood that is heated or steamed for bending.

◆

BUILDING MATERIALS for the reconstruction of Valparaiso will probably be exempted from import duty. Such a proposal is before the Chilean Government.

CABINET WORK FOR THE CARPENTER—THE BEDROOM.

By Paul D. Otter.

We have in past issues considered what may be designated as the principal rooms of a dwelling, so we will now adjourn to the less elaborately decorated apartments and consider the sleeping room. We do not mean by this that the sleeping apartment be unattractive but rather that it should be simply furnished, the furniture being free from excessive ornament in the way of carvings and elaborate moldings, for the aim should be to show the beauty of the grain of the wood under a tinting or stain that needs no excessive drapery to set it off.

As the "Mission" style, or now properly known as the "Arts and Crafts," is very much in favor, Fig. 1 is offered as a suggestion on which to work. The size intended is 4 ft. 6 in. x 6 ft. 4 in, long, with the back 51 in. and the foot 41 in. in hight. It would be well to get other points and information from a standard bedstead. The posts are 2½ in. square; top rails 1½ in. x 2 in. and the splats ½ in. thick, with edges and openings smoothly sanded. The chest is framed into the front posts as shown, with the lid lifting. This will be found very convenient for extra sheets or blankets.

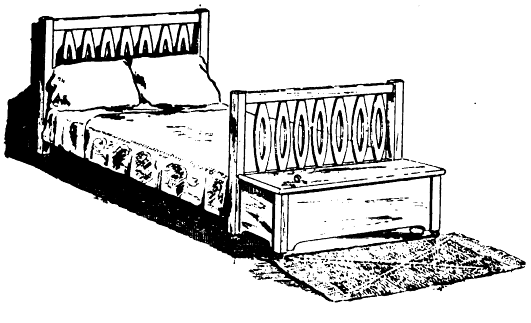


Fig. 1.—Bedstead with Chest.

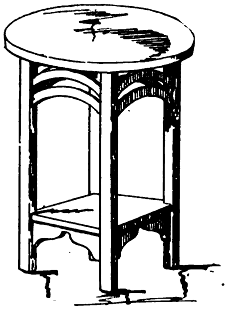


Fig. 2.—Bedroom Table.

Cabinet Work for the Carpenter.—The Bedroom.

Naturally no cracks or crevices should be allowed to go unfilled in any bedroom furniture, so for this purpose a mixture of glue and sawdust will be found good to "putty" into all such places previous to finishing.

Little need be said concerning the sidetable shown in Fig. 2, which will always be found serviceable for a clock, lamp or book. The top is 17 in. in diameter and stands 29 in. from the floor; the posts being 1⅜ in. square. A suggestion is made here which would turn this pattern to double use by boxing in three sides to a hight of 10 in. above the bottom shelf and providing the fourth side with a hinged door, and a top over all, thus making a suitable bedroom commode stand if so desired.

An article quite essential to the bedroom is the costumer, or clothes tree, which permits of garments being thoroughly aired during the sleeping hours, rather than laying them across a chair-back to form wrinkles and creases.

Nine pegs are indicated in Fig. 3, although the number and disposition is entirely optional, the main point being to stagger their position so that one garment will not overlap another when hung up. The posts and arch are made of 1¼ x 2 in. material, the posts being 9 in. apart and the distance from the floor to top of arch measuring 6 ft. The top cross bar measures 40 in. and the lower bar 30 in. in length, each is 1 x 2 in. wide, slightly halved out to fit the posts, the faces of posts and bars being rounded as shown. The base is 1½ x 2 x 6 x 24 in. raised at the corners by flat turnings as shown. The pegs to project 4 in.

Occasionally a man may wish to view himself full length in his proud clothes—but a lady always—so a full length mirror must be a part of the furnishing, materially adding in its usefulness to the attractiveness of the room. In Fig. 4, the mirror shown, 20 x 52 in., is set in a frame of 1¼ x 2 in., and swung within a stand consisting of 1⅝ in. square posts mortised into bases 1¾ in. thick, and 21 in. long, and cut within a width of 4½ in. according to this or similar pattern, the two parts being securely mortised and tenoned. The hanging pins may be turned in some hard wood, or be of metal, so placed, by experiment, between temporary posts to swing to stay either tipped forward or thrown back as wanted.

The shoe and slipper chest might be dispensed with if no further use was made of it, but as the one shown in Fig. 5 is intended, outwardly as a window seat, it forms a finish to the room and a place to put on shoes, or keep in proper bounds shoes and slippers when not in use. This chest is built of 1-in. material, the top and front side swinging forward to the floor on hinges as one piece when the chest is open, as shown. A corner bracket holds the top and front at each end.

It will be noticed that the top of the chest is of panel construction, over which a light padding of cotton and hair may be placed in an even manner, this in turn to be covered by a piece of colored sheepskin cut somewhat larger than the exposed panel size, this to be neatly tacked down just within the outer framing by brass-headed nails.

Refinement in outline should be the first suggestion of the dresser. We think of it more as the ladies' work table, in fact there is little room left for the dear man to share in it. Possibly Sundays he takes a flash light of himself in the mirror to see that his outer rigging is extra satisfactory for an off day. In the illustration, Fig. 6, the Colonial style is uppermost. The after finish is a delight to the eye and pleasant to the touch. With the figures given on the sketch no difficulty will be experienced in making the one-half drawing of the front elevation, and in drawing the end view it is well to keep within an over-all width of 22 in., having for a back leg a 1¾ in. square post reduced to a slight taper. Between the front and back posts draw a framed panel, the width of framing being 3 in.—the panel, a well selected piece set in either a rabbet or a groove in the framing. A similar paneled construction constitutes the back. This should have one or two upright mullions between distance of the back posts, the frame and filling being of course of a cheaper wood. The first, second and bottom drawer divisions are similar unfilled frames with a center mullion. The top frame is of the same character except that it shows a ⅝ in. projection over posts and is molded ¼ round. This framing is glued and screwed onto the top, which is ⅛ in. longer on the ends and front, treated with a more than quarter round finish.

We now have the various parts of the carcase to assemble according to the plan which should be prepared in connection with the front and end views, which will show just how much is to be cornered out on the drawer divisional frames to bring them into contact with the inside face of end and back framing, where at the proper place they are to be secured by diagonally countersunk screws, and further fortified by three-cornered glue blocks. The dividing board between the two small top drawers is now put in place and held by screws through middle mullion into bottom edge and glue blocked against back frame. The reinforced top may now be put in position over posts and brought down tight by screws diagonally placed through framing and also into post corners. The corner posts should not be reduced by the spoke shave to a full quarter round, but in the final sanding and finish no evidence of flatness should be apparent.

The drawers should properly be dovetailed and be made of exceptionally dry material.

The stanchions are turned from stock 1¾ in. square, a square base being left to mortise with a 1½ in. cross bar immediately under swinging mirror. This mirror stanchion is held to top of dresser by a lag machine bolt secured in ends of stanchion posts and passing through top of dresser to be held by a nut and washer. The beauty of the narrow mirror framing depends greatly on the even roundness given it, and when oak is used the display of quarter is everything here and on top, as well as on the drawer fronts. Avoid selecting overlarge and ornamental hardware as the plain remains good through all changes in style.

◆

The State School of Ceramics at Alfred, N. Y., opened the fall term with an increase of 40 per cent. in the registration of students.

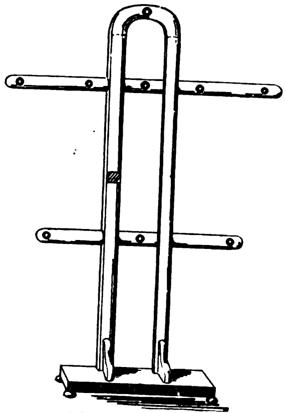


Fig. 3.—Costumer.

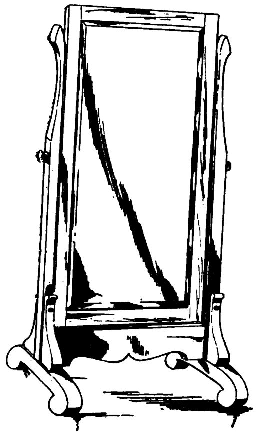


Fig. 4—Cheval Mirror.

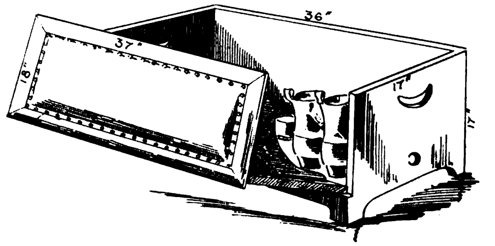


Fig. 5.—Window Seat Shoe Chest.

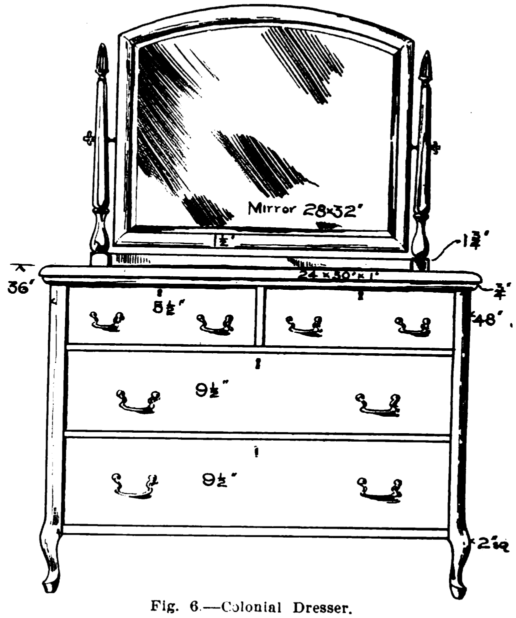


Fig. 6.—Colonial Dresser.

Cabinet Work for the Carpenter.—The Bedroom.

A Novel Fireproof Residence.

Architects and builders are likely to be very much interested in the mode of fireproof construction which is being adopted in connection with a residence to be put up at Greenwich, Conn., in accordance with plans completed by Hiss & Weeks, 111 Fifth avenue, New York City. The residence, which will be 213 ft. long and 70 ft. wide, will have its frame and floors constructed of reinforced concrete, the reinforcement consisting of round steel bars, while the walls and partitions will be of fireproof terra cotta blocks of special design. The outside walls will consist of two tiers of terra cotta blocks, the outer tier being formed with 8-in. blocks, while the inner tier will be formed of 4-in. blocks. Between the two tiers will be a 4-in. air space, running the entire hight and width of the building. The finish on the outside will be a stucco applied directly to the blocks, which are corrugated, thus doing away with the use of wire lath or any other device to hold the plastic cement. The partitions or interior walls will be constructed of the fireproof terra cotta blocks, but smaller in size than those used in the outside walls.

This is the novel feature in the construction of the building, and the claim is made that it will make the house warm in winter and cool in summer, besides rendering it entirely fireproof, waterproof and earthquake proof.

We understand that something over 800 tons of fireproof terra cotta will be used in the construction, and the total cost of the building will be between $200,000 and $300,000. The residence is intended for Percy Rockefeller, a nephew of John D. Rockefeller.

WHAT BUILDERS ARE DOING.

Building continues very active in Chicago and shows a healthy gain in October figures over the corresponding month a year ago. Permits were taken out during the month for the construction of 945 buildings, having a frontage of 25,820 ft., aggregating in cost $5,219,900, against 724 buildings, with a frontage of 22,940 ft., at an aggregate cost of $4,918,155 in 1905, an increase of 221 buildings, 2880 ft. of frontage and $301,745. The most significant feature of the figures is the large number of buildings, indicating a healthy condition among people of moderate means and showing that the area of prosperity is greatly expanded. The figures in detail for October for a number of years back are as follows:

October, 1906	945	25,820	$5,219,900
October, 1905	724	22,940	4,918,155
October, 1904	707	21,395	4,703,550
October, 1903	568	21,030	3,840,170
October, 1902	563	17,579	4,056,205
October, 1901	586	17,182	2,952,660

The totals for ten months of the present year, compared with the same period last year, are as follows:

	1906.			1905.		
	Number b'ldings	Feet frontage.	Cost.	Number b'ldings.	Feet frontage.	Cost.
January	495	14,824	$2,830,200	345	9,498	$1,847,700
February	611	17,301	4,507,200	269	7,835	3,472,700
March	926	25,053	4,267,650	665	26,943	6,116,655
April	1,105	28,267	12,139,875	866	26,285	7,298,300
May	1,035	27,737	6,252,720	775	21,139	3,813,710
June	1,092	28,151	6,491,500	731	21,386	7,659,360
July	934	23,558	4,849,960	768	18,869	3,778,390
August	991	25,387	5,439,175	913	22,610	6,401,150
September	1,085	24,609	4,579,200	1,003	27,525	7,349,150
October	945	25,820	5,219,900	724	22,940	4,918,155
Totals	9,119	240,707	$56,577,380	7,059	205,032	$52,655,270

A striking feature of the local situation is the prospect of more or less factory building in the immediate future. The recent purchase of a site by the Chicago & Northwestern Railway Company for its new terminal station in the district devoted largely to the machinery trade will necessitate a removal of the latter to other districts where it is probable many new buildings for factory purposes will be erected.

The Chicago City Council at a recent meeting amended the Building Code in respect to the construction of fireproof buildings on the model of the new Marshall Field store. The amendment provides that in buildings of the Field type one stairway to the floor is sufficient, the Aldermen deciding there was abundant exit space into adjoining buildings through fire walls protected by automatic iron doors. The ordinance amending Sections 457 and 458 of the Revised Municipal Code regarding buildings as recommended and passed by the City Council is as follows: "Section 458.—Whenever any building of fireproof construction used wholly or in part for the purposes of class VII shall adjoin or be attached to a fireproof building, used by the same occupant and having in its required intervening fire wall one or more openings, and fitted with fire doors on each side of the fire wall, having self-closing device thereon, as approved by the Building Department, then every such opening shall, for all purposes, be held to be equivalent to and take the place of and be regarded as a stairway, built and inclosed in the manner described in the following section (459). But in no case shall there be less than one stairway in any such building."

"Section 457.—Provided, however, that if any building used wholly or in part for the purposes of class VII be equipped with automatic sprinklers, and be connected with another building similarly used, and distant not less than 25 ft. and used by the same occupant, by a fireproof bridge or passageway similarly equipped, then each such bridge or passageway shall be held to be equivalent to and take the place of one outside stairway fire escape on each of the buildings so connected."

The amendments were passed only after considerable discussion and over the opposition of the Building Commissioner and several members of the Council, particularly on the ground that the floor space is too large to be served safely by one stairway, that the width of the stairways is not regulated nor inclosing protection provided, and that the fire doors might not work properly. The various objections were overruled, however, by a majority of the members of the Council and the amendments ordered passed.

Cleveland, Ohio.

The annual meeting of the Builders' Exchange of Cleveland was held on the evening of Thursday, November 8, being attended by 150 members. The programme of the evening was divided into two parts, a brief session being held in the exchange room, in which reports were presented by the officers and committees, this being followed by a banquet in the Chamber of Commerce Club. The reports indicated the exchange to be in a flourishing condition, the limit of 375 members having been reached during the year and important additions having been made to the exchange assets. At the banquet the annual address of the president was delivered by W. B. McAllister, who dwelt largely upon encouraging young men to enter the building trades.

The report of the Board of Directors was presented by the secretary. This was in pamphlet form and gave much valuable and interesting information relative to the organization. The work was illustrated by means of half-tone engravings, these including one showing the banquet room at the annual meeting in November, 1905; another taken in connection with the annual outing at the Thousand Islands, while another shows the members at a social and business lunch.

A life size portrait of retiring President McAllister was presented to the exchange by the Board of Directors, the speech in this connection being made by Treasurer F. G. Hogen. An address was delivered by F. F. Prentiss, president of the Chamber of Commerce, who congratulated the exchange upon its progress, and also by Walter Drew of New York, secretary of the National Erectors' Association.

Detroit, Mich.

The city of Detroit is now enjoying unusual activity in building operations, and the month of October broke all records in the valuation of new buildings and number of permits issued at the City Fire Marshal's office. The official records show that in the 28 working days of the month permits were taken out for new buildings and additions amounting to $1,516,800, as compared with $918,150 in 1905, which shows a remarkable gain for the past year. The total number of new buildings for October, 1906, was 420, against 340 in 1905.

The year 1905 broke all records for building activity previous to that time, but in the 10 months just ended the record of the whole 12 months last year greatly exceeded the actual gain so far, being over $2,000,000. It is not expected that November will equal the phenomenal record established in October, although the contractors are having all they can do to keep pace with buildings already planned.

Among the large new buildings now being erected in Detroit are the following: Ford Building, to cost $1,500,000; Hotel Pontchartrain, $1,000,000; Produce Exchange, $125,000; Home Telephone Company buildings, $135,000; Michigan Telephone Company, addition, $100,000; Grand Trunk round house, $75,000; Michigan Stove Company, addition, $75,000; J. D. Kennedy, apartment house, $30,000.

Fort Worth, Texas.

The sixth annual convention of the union bricklayers of Texas came to a close on the evening of October 17, the final feature being a banquet tendered by the local, No. 6, in honor of the visiting delegates and especially as a courtesy to Dallas Union, No. 5, a large representation of which was present.

During the business session of the day the Committee on Wage Scale reported in favor of the 75-cent minimum scale, which report was unanimously adopted. There are 22 unions in the State and out of this number 19 were already using this scale, which left only three abiding by the 70-cent scale. The action of the convention was therefore more in the nature of a ratification of a measure already established than otherwise, and this fact assures the measure meeting with no opposition.

The Committee on Grievances had no report to make, saying that there were no grievances whatever. There was never a time in the history of the organization when its affairs were in better condition. The financial affairs, according to the report of the Finance Committee, are in excellent shape.

The organization is growing rapidly, as is shown by the increased number of unions and by the growth of the individual locals, the membership throughout the State being 600.

The banquet on the evening named was a very complete fraternal occasion, there being rendered an excellent programme earlier in the evening.

Los Angeles, Cal.

There was a rapid revival in Los Angeles building from the temporary quietness that prevailed during the greater part of September. The predictions made that the Los Angeles building operations would be adversely affected by the great stimulation of building in San Francisco have not been borne out, and it now looks as though the removal of many former San Francisco business houses and professional people from that city to Los Angeles will more than counteract any such effect.

During October the total number of building permits issued was 788, authorizing improvements to the value of $1,859,267, making this month one of the largest from a building standpoint in the history of the city. During September the number of permits was 633 for improvements valued at $1,070,744, and during October, 1905, the number was 1070 for improvements aggregating $1,348,556. Among the permits issued during the month just closed were: Two for steel frame class "A" buildings, valued at $425,000;

5 for reinforced concrete class "A" buildings, valued at $356,000; 16 class "C" buildings, valued at $142,710; 335 one-story wooden buildings, valued at $366,699; 18 one and one-half story wooden buildings, valued at $38,625; 61 two-story wooden buildings, valued at $250,651; 2 three-story wooden buildings, valued at $29,000; 3 municipal buildings, valued at $33,372; 44 brick alterations, valued at $100,562; sheds, foundations, &c.

New York City.

Probably the most noticeable feature of the local building situation is the heavy shrinkage in operations indicated by the statistics for the month of October. For some little time past there have been indications of an overplus of housing accommodations in the upper section of the city, and while the amount of new work projected in September was less than that of the month before, October shows an appreciable shrinkage, as compared with two months ago. In the Borough of Manhattan especially the lessened activity is notable in all construction, but is most marked in tenements, for which plans for only 14 were filed in October, as against 36 in September, 97 in August and 154 in May of the current year. How sharp the contraction has been is shown by the fact that while at the end of June the total value of the projected improvements in the Borough was $14,000,000 in excess of that for the same period last year at the end of October it had fallen to about $4,000,000 below the amount for the corresponding period of 1905.

Taking the figures for the Boroughs of Manhattan and the Bronx for the first 10 months of the year it is found that the value of the building improvements projected amounted to $127,539,000, as compared with $140,257,500 in the corresponding period of last year. There was a shrinkage in the Borough of the Bronx in the period named of a trifle over $9,000,000.

In Brooklyn the same general tendency is apparent, and for the first 10 months of the year there has been a shrinkage in the value of building improvements of nearly $12,000,000, due in large measure to a subsidence of the boom, which for two years past had been witnessed in the improvement of suburban property.

Oakland, Cal.

The amount of building now under way at Oakland is greater than was ever before known, and according to plans now in the hands of architects the coming month will show a still larger amount of work. The last week of October more new construction was undertaken than in any previous week in the history of the city. During that week 137 permits were issued authorizing construction work amounting to $311,091. This shows an average of about $2500 per permit, showing that the work under way is of a good, substantial character. The permits for the week include: One four-story concrete hotel building, valued at $109,200; 1 three-story frame hotel, valued at $32,000; 2 three-story frame lodging houses, valued at $33,825; 2 stores, valued at $1375; 1 three-story flat, valued at $8000; 9 two-story flats, valued at $12,087; 3 two-story dwellings, valued at $21,275; 2 one and one-half story dwellings, valued at $1150; 39 one-story dwellings, valued at $56,526, and a number of repairs, alterations and additions.

During October the total number of building permits issued in Oakland was 493, authorizing improvements valued at $911,708. None of these figures include the suburban towns of Berkeley, Alameda, Fruitvale and Emeryville, which except in government are a part of Oakland and where building is on the whole as active as it is within the city limits.

Omaha, Neb.

A local paper, in discussing the building situation in the city, states that the men employed in the various branches of the trade are very busy and are likely to have all the work they can do until freezing weather sets in. The demand for men in most lines is greater than the supply and contractors are frequently much inconvenienced by delay on this account.

Bricklaying in Omaha is strictly union work and the regulation wage is 62½ cents an hour. The foremen got 75 cents. This is considerably more than bricklayers received three or four years ago. Carpenters are paid according to their ability and speed, from 30 to 45 cents an hour, and the foremen get 50 to 55 cents.

Stone masons are paid 62½ and stone cutters 50 cents. The scarcity of labor in this line, in addition to the scarcity of stone, was one of the causes of so much delay in the construction of big buildings in Omaha this summer. Plasterers get 55 cents an hour; laborers and hod carriers, 25 to 30 cents; lathers, 50 cents; sheet metal workers, 40 cents; structural and ornamental iron setters, 40 cents; tile setters, 50 cents; plumbers, steam fitters and gas fitters, from 56½ cents an hour to as high as $30 a week; painters, 42½ cents an hour. In general, these wages have been gradually rising in the last few years and the average wage is several cents an hour higher than it was three years ago and even very noticeably higher than a year and a half ago.

Philadelphia, Pa.

While it is contended by some that the end of the building boom in this city is in sight, it must also be taken into consideration that at this season of the year it is quite natural to record a falling off in new work, and from now on until early spring the work undertaken will be dependent largely on climatic conditions. Last winter was exceptional, in view of the mild weather, and should the coming season be a mild one a considerable amount of new work will no doubt be started. In some sections of the city building has probably progressed in advance of the natural demand, while in other sections the demand for dwelling houses continues very large.

During the first 10 months of the year statistics show an estimated cost for work during that period amounting to $35,671,850, compared with $31,067,030 for the same period in 1905, a gain of $4,604,820, which, together with new work for which permits will be taken during November and December will no doubt make this year the banner one in this city.

During the month of October statistics taken from the Bureau of Building Inspection show that 922 permits for work estimated to cost $4,379,600 were taken out, which figures surpass all previous records for the month of October, the best previous record for that month being October, 1901, when the estimated cost was $3,154,570. Of this month's total, $1,428,850 was for two-story dwelling houses, a gain in value of 100 per cent. over the month of September for this class of work. Manufacturing buildings, workshops and boiler and engine houses during October show a gain of $471,600 in value over the previous month, while permits for places of amusement showed an aggregate estimated cost of $516,000, while during September this class of work showed an estimated cost of but $20,000.

The exceedingly high cost of building operations has and will no doubt restrict the erection of many buildings. Were not the cost so high there is scarcely a question but that the amount of building in the way of additions to plants would have been very large. A number of cases are in mind where revised estimates had been made for contemplated work, but costs still remain prohibitive and contracts for the work are still unplaced.

The moderate weather conditions this fall have been favorable to building operations in general, and work has been rushed forward at the best possible speed, so as to get the various operations advanced as much as possible before freezing weather sets in.

Every branch of the trade is most actively engaged. Labor is fully employed and a scarcity of skilled mechanics prevails in a number of the different branches of the trade. Manufacturers of building materials have their plants fully occupied and find difficulty in making deliveries as promptly as the trade would like.

Pittsburgh, Pa.

At a largely attended meeting of master builders and contractors, held in the rooms of the Builders' Exchange League on the evening of October 24, resolutions were passed declaring for the merit system. After citing that in view of present and past conditions in the building industry of Allegheny County it had been found that it was to the best interest of the public welfare to declare for the open shop or merit system, the resolutions concluded: "We, as a representative body of contractors, indorse this movement and extend to the Master Builders' Association our hearty support and co-operation."

Addresses were made by the president of the league, R. K. Cochrane; by W. B. McAllister, president of the Cleveland Builders' Exchange; also by Walter Drew, secretary of the National Erectors' Association, and H. L. Kreusler and W. T. Powell, former presidents of the Master Builders' Association of Pittsburgh.

The secretary of the Builders' Exchange League has just compiled a very interesting little work of 75 pages containing its articles of incorporation and amendment thereto, also by-laws, the names of officers and members of the league, together with a list of members of branch associations. The names and addresses of the members are arranged in alphabetical order and classified in a way to render the little work exceedingly interesting and valuable for reference.

The secretary has also compiled a directory of the Builders' Exchange League, in which is given the names of the officers, standing committees, board of directors, &c., together with the names and addresses of the affiliated associations. The size of each book is such as to readily permit of its being carried in the pocket.

San Francisco, Cal.

The building records of the city show that there has during the last month been a considerable falling off in construction of the smaller sort of buildings, ranging in cost from $1000 down, although there has been no drop in the construction of more important work, says our correspondent, writing under date of November 8. The falling off in the volume of cheap wooden construction is due in part to the season, but also to the easing up in the demand for temporary buildings of all sorts. The extremely high rates charged for insurance, ranging from 6 to 10 per cent., on all stocks carried in these temporary structures, the very real danger of fire in such districts as those along Van Ness avenue and Fillmore streets, where solid blocks of wooden

buildings have replaced the former residence district, and the general inconvenience of doing business in these temporary quarters have given force to the demand for more permanent quarters in fireproof or semifireproof buildings.

During the month of October the building permits issued for construction work ranging above $1000 in value numbered 628, and the aggregate value of these was $5,365,000, as compared with 525 permits, aggregating $5,638,000 in value during the month preceding. The fact that the aggregate value of the September permits was greater than that of the October permits though fewer in number does not indicate that there has been a drop in the character or cost of the buildings undertaken. During September the permits for the reconstruction of most of the damaged skyscrapers were issued, this item alone amounting to $1,375,000 during that month. In October, on the other hand, very few of these reconstruction permits were issued. With this reconstruction item taken from the September record the showing indicates that there has been an increase rather than a decrease in the average cost per building during the month just closed.

During October 118 permits were issued for brick buildings of an aggregate value of $2,712,000, as compared with 103 brick buildings of an aggregate value of $2,630,000 during September. The concrete construction work for October included 10 buildings valued at $190,000, as compared with 7 buildings valued at $418,000 during September.

The material and labor situation has improved rather than otherwise during the last month. The strikes in the planing mills of this city and Oakland were finally settled about the middle of October, and since then no acute labor troubles have been experienced. About the same time an organization of downtown property holders met to discuss the situation with the union labor organizations as represented in the San Francisco Building Trades Council. It was put before the labor leaders that the property owners were arranging to bring in large numbers of skilled workmen to assist in building up the city, and that it was hoped and expected that these new men would be admitted into the various unions without undue restrictions. The labor leaders disclaimed, on the part of the unions, any desire to restrict the number of men permitted to work in the city, and after some discussion an agreement was finally reached that both sides should undertake to maintain the present wage scale for a period of two years, and that the unions should admit freely during that time all skilled mechanics reaching the city and seeking admission. Neither side is in a position to enforce this plan, but an endeavor will be made to have all disputed points settled as rapidly as possible on a two-year basis, as was done in the case of the mill men.

Building materials are now in pretty fair supply, with the exception of lumber. The latter is coming in by sea at the rate of about 4,000,000 ft. per day, but at this rate it cannot be unloaded with the present facilities. The railroad has lifted the embargo on lumber which has prevailed for some time, and an increase from this source is expected. During October the water arrivals amounted to approximately 110,000,000 ft., but the stocks in the city are still badly broken, and there is probably not now on hand more than one month's supply. Lumber cargoes are selling at $1 off the list price of $24 for rough pine and spruce, which is about the same as the cargo prices a month ago. The retail price of lumber is now $2 higher than a month ago. Cement is plentiful, but a little firmer than it was. Quotations range from $2.70 to $3.25 for foreign. Domestic cement is not to be had, as the available supply is tied up with Government contracts or is prevented from reaching the city by the scarcity of cars. Common brick is plentiful and cheap, with very little demand for new brick, owing to the extensive use of second-hand brick and of concrete. Facing brick and terra cotta are in fair supply, and are just about equal to the demand at prevailing prices.

Considerable interest attaches to the status of the wooden buildings that have been erected within the fire limits since the April fire. The city charter forbids the exclusion from the fire limits of any part of the city which has ever been included within those limits. For a few months after the fire the city authorities permitted the erection of one-story wooden buildings within the fire limits, and even since the adoption of the new building law a number of wooden buildings have been put up within the fire limits. The general understanding has been that these temporary buildings were to be allowed to remain for two or three years. Now, however, these seems to be a probability that interested property holders or the insurance companies will resort to the courts to compel the removal of wooden buildings erected without warrant of law within the fire limits. On the other hand, there is some doubt as to whether or not they can be removed without serious trouble even at the end of the term for which they were supposed to be erected. There is a growing opposition to the further construction of flimsy wooden buildings, and the blowing down last week of a three-story wooden building which was under construction on Howard street has not tended to restore confidence in this class of buildings.

Among the more important buildings on which work has been commenced during the past month or for which permits have been secured or contracts let are the following: The two-story reinforced concrete Winslow Anderson Building on Sutter street, to cost $40,000; the Duncan Hayne Building on Battery and Commercial streets, to cost $52,000; the six-story brick Morton L. Cook Building on Second and Minna streets, to cost $50,000; the five-story brick, terra cotta and sheet metal Sahlein Building on Bush and Polk streets, to cost $50,000; the four-story steel frame, stone and concrete fireproof F. M. Green Building, to cost $75,000; the eight-story steel, stone and concrete Luhning Building on Kearney street, to cost $200,000; the four-story reinforced concrete Clark Building on Turk street, to cost $140,000; the Muirhead Building on Market and Hayes streets, to cost $50,000; the eight-story steel frame reinforced concrete T. S. Williams Building on Mission and Third streets, to cost $160,000; the six-story reinforced concrete Lichtenstein Hotel at Market and Pine streets, to cost $150,000; the eight-story reinforced concrete Boyd Block at Pine and Davis streets, to cost $175,000, and the five-story Rocklin & Sharp Building on Third and Tehama streets, to cost $125,000.

Notes.

The Department of Building Inspection in Schenectady, N. Y., has under consideration the question of licensing all contracting carpenters.

Building operations in Wilmington, Del., are almost at a standstill on account of the high price of building materials and the tendency to advance still further. The only building material which has not increased in price is brick.

For some little time past the management of the Builders' Exchange at Memphis, Tenn., has been striving to bring the membership up to a total of 100, and on September 9 this was accomplished by the election to membership of the Memphis Fiber & Plaster Company.

The former rooms of the Builders' Exchange, at 425 Fifteenth street, Oakland, Cal., are now conducted by the Master Builders' Exchange, of which D. S. Brehaut is president; George C. Noll, secretary, and H. F. Staring, acting secretary.

Increased activity in the building line has recently developed in Providence, R. I., and operations are under way involving a number of new structures. One improvement company has taken out permits for seven dwellings, while additions are being made to various business structures, factories, &c.

The strike which has been in progress for some time past among the building trades in Edmonton, Ala., was settled September 22, when the men returned to work on a compromise agreement. Men working on buildings will receive $2.25 for nine hours until April 14, 1907, when the wages will be $2.25 for eight hours. The members of the Builders' Exchange agree to employ only union men, and the union agrees not to engage in a sympathetic strike.

At an official joint meeting held on September 23 a settlement of the strike in the building trades at Winnipeg, Man., was reached, and calls for arbitration of all difficulties which may arise between employers and workmen in the building trades. A permanent Board of Arbitration was selected, consisting of A. M. Nanton, A. W. Puttee, A. McDonald and R. T. Riley. These members are vested with power to select a fifth in case of necessity.

At the State meeting of the Bricklayers' and Masons' unions, held in Du Bois, Pa., October 31, reports were presented showing the building business to be good in all sections and the demand for bricklayers and masons in some localities exceeding the supply. The statement was made that while the scale of 50 cents an hour was being adhered to. some contractors, owing to the difficulty in securing the help they needed, were paying 5 and 10 cents more than the scale.

The Massachusetts State convention of journeymen carpenters will be held in Commonwealth Hall, Worcester, on January 21. Delegates from every carpenters' union in the State will attend the convention, as well as the presidents and secretaries of Connecticut, New Jersey and New York carpenters' district councils. The chief business of the convention will be matters pertaining to the improvement of the journeymen carpenters in Massachusetts and the election of officers for the first half of the year.

The past season has been one of the best in many years in the building line in Houghton, Mich., and architects, contractors and builders are exceedingly busy. Just at present unusual activity prevails in an endeavor to finish up work that is about completed or which must be finished before there is a heavy fall of snow. Builders are not looking for another winter of such splendid weather the greater portion of the time as occurred a year ago, although with an open winter assured contracts aggregating a large sum would be awarded. There is a good demand for houses to rent, and the prospects are that many new dwellings will be erected in the near future.

LAW IN THE BUILDING TRADES.

By W. J. Stanton.

THE Supreme Court of Massachusetts has decided that an architect who was to receive a certain sum for preparing plans and specifications and supervising the erection of a building is not entitled to a mechanic's lien, the contract being entire and the statute giving no lien for preparing the plans and specifications.

CONTRACT SUFFICIENT TO CREATE LIEN.

A contract for work provided that it should be completed by a specified date, and that final payment should be made within 30 days after the contract was fulfiled, and authorized the architect to make additions or deductions from the contract price on account of alterations in the work and to find the balance due and give his certificate therefor, payments being made on the certificate of the architect. Under these facts the Supreme Court of Illinois held that, though the final payment, according to the terms of the contract did not become payable until the certificate was given, the contract specified the time for the completion of the work and a definite time when final payment should be made, rendering it sufficient to create a lien.

POWER OF ARCHITECT.

A contract for the erection, alteration and extension of certain buildings made the architect the agent of the owner, and stipulated that no alteration should be made in the work described by the specifications, except on the written order of the architect, and then no extra work would be allowed unless an itemized estimate was submitted by the contractor, and the architect's order in writing was given for the same. Under these facts the Court of Appeals of New York held that the architect could not enlarge his powers by waiving the requirement that the contractor should furnish estimates of extra work and obtain a written order from the architect therefor.

SIGNATURE OF CLAIMANT—DESCRIPTION OF MATERIALS.

The Appellate Court of Indiana holds that the signature of a notice of a claim of a materialman's lien in the name of the materialman by his attorney is sufficient. The same case holds that in proceedings to establish a lien for materials for a heating plant a notice of claim of lien, stating that the claim was "for work and labor done and materials furnished in the erection and construction of said house," was sufficiently specific.

PERFORMANCE OF BUILDING CONTRACTS.

The rule of law that there can be no recovery on a contract to do an entire piece of work for a specific sum, unless the work is performed, has often been applied to building contracts, and the rule, subject to certain exceptions, is that if by the terms of an entire contract the plaintiff is to build a house for the defendant within a given time and for a gross sum, he cannot recover anything, either upon the special contract or pro rata, until full performance on his part. In such cases performance is to precede payment and is the condition thereof; and the fact that the structure is accidentally destroyed by fire or otherwise just before its completion, and without the fault of either party, does not change the rule. There can be no recovery before an acceptance of what has been done. The same rule applies to a contract under which materials are to be furnished or put into a building where it is destroyed by fire or otherwise before the contract is fully performed. . The loss falls upon the contractor and not upon the owner, for a contract to furnish materials and perform work in the construction of a building as an entirety, and no part of the work is regarded as being done or material as being furnished until the whole contract is complete. Under special terms of the contract the loss may sometimes be thrown upon the owner. A contract to build a house in which it is stipulated that the entire work is to be completed before any part of the compensation is demandable is an entire contract. A workman can recover nothing under an entire contract for the building of a house which is destroyed by fire before its completion, but it is otherwise if the contract is not entire. A contract to erect a house for the cost of the labor and material, with a certain per cent. of the total cost added as compensation to the contractors, payments to be made as the work progresses and the balance on completion, is entire, although there is no specific sum mentioned as the contract price. The payment of money by instalment for convenience of the contractor does not necessarily affect the entirety of his contract to build and deliver a complete house. Hence, if the building is destroyed by fire before its completion he cannot recover an instalment due him. On the other hand, if it is expressly provided in the contract that the last instalment is not to be paid until the completion of the building it cannot be recovered where the whole work is consumed by fire, without apparent fault of either party, before its completion. A contract to erect a building for a certain price, payable in instalments, is an entire contract, and a destruction thereof by fault of the builder or inevitable accident gives the owner a right to recover all instalments paid. So the destruction by fire of a house which was being built under contract does not relieve the contractor from liability to an action for money advanced upon the contract and damages for its nonperformance, although at the time of the fire he had substantially performed his contract, if the house had not been completely finished and delivered. Again, a latent defect in soil does not excuse the contractor from erecting a house which he has covenanted to build.

One party to a building contract cannot be compelled to accept work not performed according to the specifications, and to rely on recoupment for his indemnity. It is a good defense, in an action for work and labor done in the building of a house on another's land, that the work was done in such a negligent, unskilful and unworkmanlike manner as to be of little or no value to the owner of the premises.

Upon the same principle, if the owner of a house and land agrees to sell and convey it upon the payment of a certain price which the purchaser agrees to pay, and before full payment, the house is destroyed by accidental fire, so that the vendor cannot perform the agreement on his part, he cannot recover or retain any part of the purchase money. Therefore, where the plaintiff contracted to sell and convey to defendant a farm having buildings thereon, and to deliver a deed in "fee simple of said premises," upon the payment by the defendant on the day named of the price stipulated, and before the day named and the tender of the plaintiff of the deed the buildings on the premises were burned and the value of the premises greatly reduced thereby, it was held that the plaintiff could not maintain an action on the contract.

As exceptions to the rule that there can be no recovery upon a building contract until the work is done according to agreement, it may be stated that the general rule does not apply where unfinished work has been accepted, or has been used by and is a benefit to one of the parties, and that a recovery may be had upon a divisible building contract. Thus, if the owner clearly accepts the property when nearly but not entirely completed, any loss occurring thereafter must fall upon him. Where the owner has accepted the building in its approximately completed condition and is using it for the objects for which it is built, the law implies a promise on his part to pay what the work done is reasonably worth. The question of acceptance, however, is a very delicate one. The mere fact of an owner taking possession of his own land on which buildings have been erected, or where repairs have been done or alterations made to a building thereon, does not afford an inference that he has dispensed with the conditions of a special agreement under which they were built, or of a contract to pay for the value of work actually done according to measure and value. A builder cannot recover unless he has complied with his contract, and it is held in New York that this is true, although the defendant has taken possession of and uses the building, as this is not necessarily a waiver of failure to comply with conditions of a contract. So it is held that where an article made immediately becomes a part of the realty, the use of it does not amount to an acceptance.

In a Massachusetts case there was a contract to repair a house and outbuildings for a certain sum, but when the repairs on the house were nearly completed the owner, by his tenant, entered and occupied it, after which the house and outbuildings were destroyed by fire. The workman was held entitled to recover for the repairs done on the house when the owner took possession.

CONTRACTOR NOT ENTITLED TO LIEN.

A contractor for the erection of buildings on a lot on which there were old buildings, took down the old buildings and sold the material at a profit and prepared plans for the new building, and during the preparation of the plans an engineer employed by the contractor visited the site and made certain examinations. The contract was then broken by the owner. The Supreme Court of New York held that under these facts the contractor was not entitled to a lien.

New Publications.

Structural Engineering Tables. By Edward Godfrey, structural engineer for Robert W. Hunt & Co. Size, 4 x 6½ in.; 200 pages. Bound in flexible leather. Price, $2.50. Published by the author.

A structural engineer himself, the author has felt the need of a book of convenient size containing as many as possible of the tables commonly required by structural computers and draftsmen. It is frankly acknowledged that many of the tables are borrowed from other books, but by consent, as for example, those from the Carnegie Pocket Companion. The different rolled sections of which properties are given are those rolled by the Carnegie Steel Company. It has been endeavored in arranging the book to put the most used tables near the front, and so eliminate frequent reference to the index. So far as possible explanatory notes and examples illustrating the use of the tables are avoided, these being more properly in the province of text books and outside the intent of this work. Among the particularly useful tables given are those for quickly obtaining the weights and areas of angles, those for saving labor in the calculating of bending moments and weights of girders, those for interpolating for intermediate sections and those for combining squares of ordinary numbers with squares of length, which avoids decimal quantities. Many valuable formulas and coefficients are also given, these being in many cases of a character not easily found in usable form in other works of reference, and many of the formulas are almost entirely new. The appendix is called the Manufacturers Section, and contains useful tables and data supplied by manufacturers concerning electric cranes, wire rope, and paint. This book is the first of a series the author intends to publish on practical mathematics, engineering calculations, designing, and kindred lines.

The Steel Square Pocket Book. By Dwight L. Stoddard; 160 pages. Size, 3½ x 5¼ in. Illustrated by means of 150 diagrams. Bound in board covers, with side title. Published by the Industrial Publication Company. Price, 50 cents, postpaid.

This is the second edition, revised and enlarged, of a practical and handy treatise giving what the author regards as the best methods of using the carpenters' steel square. The book is of such a size as to enable the mechanic to carry it in his pocket, where he can readily refer to it if necessary for the method of finding the different cuts used in roof framing, stair work, hoppers, arches, &c. At the same time directions are given for describing hexagons, octagons and other polygons, circles, ovals, ellipses, dividing a cone, solving examples in proportion, as well as clear directions for solving many other knotty problems by the use of the steel square. The author points out that the entire book has been rearranged, many parts rewritten and considerable matter added, including some 40 new illustrations. In running over the pages a noticeable feature in connection with the diagrams is the absence of reference letters, too many of which often tend to confuse the mechanic rather than to assist him in a solution of the problem with which he may be concerned. Not the least interesting feature is an index alphabetically arranged, and which will greatly facilitate reference.

◆

Salt in Concrete Sidewalk Construction.

One of the papers read at the Milwaukee meeting of the National Association of Cement Users dealt with the use of salt in concrete sidewalk construction, and in the course of his remarks the author, George L. Stanley, Ashtabula, Ohio, who has had something like 14 years' experience in laying cement walks, presented some very timely suggestions. The extent to which concrete sidewalks are being used in every section of the country renders particularly interesting at this time the following extracts:

The fact that it is often necessary to do considerable work in freezing weather makes it desirable to be able to lay and care for the work in such a manner that it may not be damaged by frost. The foundation should be porous and as well drained as possible, as freezing the first 24 hours after the walk is laid is liable to expand the ground under the walk, which will crack the walk before the hard setting takes place. The use of what salt can be dissolved in the mixing water will prevent the walk from being scaled or cracked by the frost expanding the concrete.

Should the sand and gravel be very wet salt should be spread on batches with the cement, so as to be mixed with the sand and gravel the same as the cement. In case this is done the mixing should be continued considerably longer, so as to dissolve the salt as much as possible before wetting, and after wetting the batches should be turned once or twice extra, as prolonged mixing increases the strength of the work.

In cool or freezing weather only water enough should be used in wetting so that the work can be floated and troweled and covered very quickly after the concrete is placed in the molds. The setting takes place slower in low temperatures, but sidewalks can be given to the public for use from one to four days sooner when salt is used.

The safest manner of caring for the walk during the hardening is to cover with sawdust, planer shavings or earth and to cover the whole walk with canvas or other covering, so as to keep the walk as dry as possible, which will hasten the hardening and prevent the frost from expanding the ground under the walk.

I have laid walks as late as December 20, and the past season about 9000 sq. ft. was laid after November 1. I use about 10 per cent. more cement in cool or frosty weather, so as to insure strong work. Walks in which I have used salt during the last seven years are fully as satisfactory as those laid without salt.

As to the effect of salt on sidewalks there may be a difference of opinion among concrete experts, but there is a general agreement that if properly used it will assist in preventing injury by frost, and if there are any injurious effects the benefits from its use leave the walk in a much better condition than it would be without its being used.

More tests are tensile and laboratory tests, and the briquettes are not usually stored on the ground, as sidewalks are laid which do not show the effects of different atmospheric and weather conditions on the concrete, but some tests have been made by engineers in charge of Government and other work which are very instructive.

In December, 1904, I molded about 75 3-in. cubes, and in one-half about 15 per cent. was used for the purpose of determining the effect of salt under different atmospheric conditions. Those wet with salt water were stored the same as those wet with fresh water. One-half of the cubes were placed in the open air on the ground before the initial set, the temperature of the air being about 10 degrees above zero. Of course those wet with fresh water were frozen solid, but those mixed with salt water showed no effects of frost when the temperature was 10 degrees above zero, except the hardening set was very slow. The other half were hardened and stored in a damp cellar on the ground until packed for shipment.

The cubes were all carefully packed, marked and shipped to the Case School of Applied Science, Cleveland, Ohio, December 15, 1905. I was assisted by two of the '06 engineering class in breaking the cubes. The records of the breaking of the cubes have been tabulated.

Of those stored in the cellar there was but little difference between those wet with fresh or salt water. But of those stored in the open air outdoors there was considerable difference—about 50 per cent. in favor of those wet with salt water—and what was the most surprising was that those wet with salt water and stored on the ground outdoors showed about 22 per cent. stronger than those wet with salt and fresh water and stored in the cellar.

These cubes were all in the same proportions of cement, sand and gravel, and about the same consistency, so that the place of storage and the atmospheric conditions were the only influences which could make the differences in the breakings.

The conclusions to be drawn from these tests are that 15 per cent. of salt can be used in the mixing water without injurious effect on concrete 3 in. thick and placed on the ground; that salt will prevent injury to concrete by frost at temperatures above 10 degrees above zero; that concrete without salt in the mixing water will be more or less injured by frost if laid in freezing weather; that if there is no frost in the material used and if proper care is taken concrete walks can be laid in freezing weather and be strong and durable.

◆

Fireproof Sandstone.

An unbroken deposit of sandstone, a mile long, and 800 ft. thick, of a quality that is available for the heaviest building purposes and that is claimed to be practically fireproof, has been opened up at Banning, Minn., where a large quarrying plant has been installed in a gorge of the Kettle River in Pine County.

The Kettle River sandstone's beautiful light salmon color brought it to the attention of builders in Minnesota, who found, on testing it, that it would stand a carrying pressure of 14,268 lbs. per sq. in. In a laboratory test a cube 2 in. sq. endured a pressure of 57,072 lb. Tests of engineers of the Great Northern Railway, proving that the stone required a lesser thickness than granite, so challenged belief that a second series of trials were made, with the same result.

Analysis of the stone showed that it contains 98.02 per cent. of silica, with just enough aluminum and oxide of iron to make it substantially a crystal line rock, and to preserve its color under all weather conditions. The stone is remarkably solid and compact, the usual voids between the larger particles of silica and rock being filled with smaller particles of silica by the geological process of redeposition.

It is claimed that Kettle River sandstone stands frost and other trying weather conditions better than marble and better even than granite. There is no sulphide of iron present in it which oxidizes, causing the reddish or yellow streaking that often makes sandstone so unattractive after exposure to the weather.

The fire-resisting qualities in the stone from Kettle River were strikingly illustrated when the town of Hinkley, Minn., was destroyed by a forest fire. The heat and draft were so intense that heavy pieces of steel were carried for miles, yet bridge abutments of Kettle River stone were in no way affected, except for the vitrifying of the surface. Under a fire test by Prof. I. H. Woolson of Columbia University, the stone withstood 1500 deg. without change.

◆

Making Imitation Quartered Oak.

A machine has recently been invented with a capacity for imitating plain or quartered oak, mahogany, walnut, elm, ash, and in fact any kind of wood with open grain, the correct imitation being secured through the use of the wood itself from which to print. Its operation is automatic like a printing press and it will take in stock from a piece of veneer up to 5 in. in thickness. The rollers for the different woods are interchangeable and can be quickly replaced. The machine was brought out by a furniture company in Detroit in order to meet its own requirements in making imitation quartered oak, and the results have been so satisfactory that it has been placed commercially on the market. The statement is made that one operator and a couple of boys can do more work with the machine than 12 men in the ordinary way.

◆

The United States Civil Service Commission announces an examination at leading cities of the country on December 5 and 6 for the purpose of securing eligibles from which to make certification to fill vacancies in the position of architectural draftsmen in the office of the engineer, Twelfth Lighthouse District, San Francisco, Cal., and at the United States Military Academy, West Point, N. Y.

Comparison of Cost of Concrete and Stone Masonry.

The cost of concrete and stone masonry varies largely with the local conditions and the character of the work on which they are used, says the *Scientific American*, but there are very few places where concrete masonry is not only cheaper than stone masonry, but better, being much stronger and more suitable in many ways. This fact is becoming more generally recognized, and more than one quarry which in former years produced building stone is now producing crushed stone for concrete. The following figures give a general idea of the comparative cost of brick masonry and concrete per cubic yard:

Brick:	
500 brick	$3.75
¾ bbl. cement	1.50
¼ load sand	.50
Labor	2.25
Making a total	$8.00
Concrete:	
1 bbl. Alpha cement	$2.00
¼ load sand	.50
Broken stone	1.50
Labor and forms	1.50
Making a total	$5.50

From the above it will be seen that on this basis their is a decided advantage in favor of concrete.

CONTENTS.

Editorial—

Correspondence—

Novelties—

THIS IS THE AGE OF THE

METAL SHINGLE

INFLAMMABLE WOOD SHINGLES, HEAVY SLATE, BRITTLE TILE AND UNSIGHTLY PAPER OR TAR HAVE SEEN THEIR DAY.

PAINTED TIN
GALVANIZED TIN

And the reason is that the NEW CENTURY METAL SHINGLE is the natural evolution of the shingle question.

They are fire proof. They are light. They are unbreakable. They are artistic—and then beyond that are qualities of durability, strength, beauty and quick adjustment—all its own.

And then figure on this—that they're cheaper than wood, cheaper than anything when you figure all the saving points involved—insurance, protection, labor cost, etc.

NEW CENTURY SHINGLES are handsome embossed design, the lock is simple, easy, perfect.

Don't fail to get the book, No. 25, we send you free, and post up on the roofing question, comparative costs, etc.

We also carry in our New York stock FANCY PLATED GRATES, FIRE PLACE TRIMMINGS.

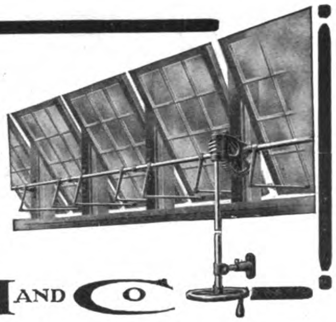
Our VICTOR COAL GRATE with 5 dampers is a fuel saver. Ask for Catalogue No. 24.

CHATTANOOGA ROOFING & FOUNDRY CO., Chattanooga, Tenn.

NEW YORK BRANCH: 440 Greenwich Street.

H AND C

THERE'S PLENTY OF CHEAP SASH OPERATING APPARATUS



the kind that's made of light materials—the worms in the gear not machine cut—the bearings not finely adjusted. If you want a good thing to do a good job, you've got to pay for it. Ours is a good thing at the right price for a good thing.

HITCHINGS AND COMPANY,
GREENHOUSE DESIGNERS AND BUILDERS,
Manufacturers of Heating and Ventilating Apparatus.
1170 Broadway, - - - - NEW YORK.

H AND C

Useful Pamphlets

At 25 Cents Each

POSTPAID

Practical Hints on Joint Wiping. For Beginners in Plumbing. Sixth Edition, enlarged, 41 illustrations. 66 pages, 5½ x 8 inches 2

House Chimneys. A Series of Articles and Letters on Chimney Troubles and Their Remedies. 62 pages, 40 illustrations .... .25

Domestic Electrical Work. Concise and Practical Explanations on Wiring Buildings for Bells, Alarms, Annunciators and for Gas Lighting from Batteries. By W. A. WITTBECKER. 55 pages, illustrated .25

Reading Architects' Drawings. Practical Suggestions for Young Mechanics. 29 pages, illustrated .... .25

Guide to Bronzing and Enamelling. Treating Liquids, Enamel Paints, etc. 37 pages .... .25

DAVID WILLIAMS COMPANY
Publishers
14-16 Park Place, New York

A NEW BOOK

Concrete-Block Manufacture Processes and Machines

By H. H. RICE

152 Pages 46 Half-tone Cuts
Bound in Cloth
Price $2.00 Postpaid

DAVID WILLIAMS COMPANY
14-16 Park Place - - - - NEW YORK

Carpentry and Building
WITH WHICH IS INCORPORATED
The Builders' Exchange

PUBLISHED MONTHLY

To all parts United States, British America and Mexico, - $1.00 Per Year
To all other Countries, - - - - - - - - - 1.25 Per Year

Advertising Rates on Application.

BUSINESS OFFICES.

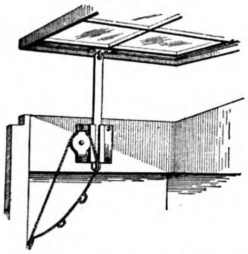
NEW YORK—DAVID WILLIAMS COMPANY, PUBLISHERS........14-16 Park Place.
PHILADELPHIA—S. S. RECKEFUS, Manager..Real Estate Trust Co. Building, Broad and Chestnut Streets.
BOSTON—WALTER C. ENGLISH, Manager........Compton Building, 161 Devonshire Street.
PITTSBURGH—R. A. WALKER, Manager........Park Building, 357 Fifth Avenue.
CHICAGO—A. A. AINSWORTH, Manager........Fisher Building, Dearborn and Van Buren Streets.
CINCINNATI—HENRY SMITH, Manager........Pickering Building, Fifth and Main Streets.
CLEVELAND—EZRA S. ADAMS, Manager........The Cuyahoga, 311 Superior Street.

ENTERED AT THE POST OFFICE, NEW YORK, AS SECOND-CLASS MATTER.

NOVELTIES.

Bee Easy Skylight Lift.

Another candidate for popular favor in the way of a skylight lift is the patented device which is now being introduced to the attention of architects, builders and house owners generally by John D. Bee, Jr., 88 West Neptune street, West Lynn, Mass. The device is referred to as being very simple in construction and can easily be applied by a person of ordinary intelligence, as there are no complicated parts to operate. It is strong, durable and inexpensive and not liable to easy derangement. The illustration, Fig. 1, clearly indicates the method of application. The fixture is shown fastened on the inside of the curb with the skylight in an open position. When the skylight is closed it is secured by the last loop of the cord, the latter being always in its proper place. The claim is made that the loop will hold the skylight any hight desired. In the case of ordinary skylights the fixture is securely fastened near the middle of the opening, but in the case of very slanting curbs the fixture is reversed and is fastened near the top of the opening. There are no springs or catches of any kind to get out of order, and the skylight is raised and locked by means of a cord.



Novelties.—Fig. 1.—Bee Easy Skylight Lift.

Sheet Metal Building Materials.

We have received from the Edwards Mfg. Company, "the Sheet Metal Folks," Cincinnati, Ohio, a copy of a rather elaborate catalogue of 168 pages illustrating and describing leading lines of sheet metal building materials which it turns out in such variety as to meet all reasonable requirements. The catalogue is oblong in shape, measuring 10 x 13½ in., is profusely illustrated, bound in colored paper covers with embossed side title in red, black and gray effects, and is stitched through the back with red silken cord. The frontispiece consists of a bird's eye view of the new plant of the company, following which is a diagram showing Cincinnati to be "the ideal distributing center." The point is made that more than three-fourths of the population of the United States lives within a radius of 600 miles or Cincinnati, while transportation facilities are of the highest order. The goods to which attention is called include an extensive assortment, such as conductor pipe, elbows, eave trough and hangers, roof gutters, ornamental roof crestings, ridgings, finials, &c., pressed corrugated sheets for siding, ceiling, doors, shutters and awnings made of black, painted and galvanized iron or copper, and of which only a limited number of designs are shown, although the company is prepared to execute any style desired. The point is made that its line of sheet metal fronts is new and original in design and that the material is shipped in sections ready to erect, so that any carpenter or tinner can put up the work. Attention is next given to galvanized iron cornices, pediments, weather vanes, finials, ornamental hip caps, ventilators, skylights, stamped zinc crestings, spun balusters, egg and dart and leaf moldings, enrichments, garlands and wreaths, scrolls, rosettes, shells and capitals, crockets, animal heads, figures and letters, brackets and modillions, panel and gable ornaments, cartouches, &c. Some comments are presented in regard to the Edwards metal ceilings and side walls, in which reference is made to the new factories erected and equipped with new machinery, so as to place the company in position to turn out a superior line of work. The catalogue is gotten up in attractive form, and it will be found a valuable addition to the architects' and builders' collection of trade literature.

Stowe's Shingling Kit.—Fig. 2.—Antislipping Sandal.

Fig. 3.—Nonslipping Shingle Holder.

Stowe's Shingling Kit.

The work of the carpenter and builder is always facilitated by having the proper tools and equipment with which to perform the service he is called upon to do, and in view of the discussion which has recently appeared in these columns relative to the amount of shingling a man can do in a specified time, our readers will find more than usual interest in a brief description of what is known as "Stowe's Shingling Kit," designed to effect economy in the saving of materials for scaffolding and to eliminate danger and fear of slipping on the roof, as well as protect the shoes and clothing of the workman from severe wear and tear. The "kit," which is illustrated herewith, consists of antislipping sandals, roofing saddle and shingle holder. The sandal, Fig. 2, is made of leatherboard, in three sizes, large, medium and small, ranging from Nos. 5 to 12 shoes. The anchors on the bottom of the sandals are pressed from sheet steel. The nonslipping shingle holder, shown in Fig. 3, is made to hold shingles on the steepest roof, and is particularly valuable in repair work. The antislipping roofing saddle, Fig. 4, straps around the waist at the hip, affording a safe and comfortable seat while at work. Both the shingle holder and the roofing saddle are made of canvas, and are provided with the antislipping anchors, such as are used on the sandals. The kit is being manufactured and marketed by the Coldwater Specialty Company, Coldwater Mich.

Monolith Floors, Wainscoting, Etc.

A building material of such a nature as to especially adapt it for use for floors, stairs, wainscoting, &c., as well as for the laying of tile floors on wooden construction without the use of concrete, is being introduced to the attention of architects and builders by the American Monolith Company, Milwaukee, Wis. The material is known as "Monolith," and consists of a dry and a liquid preparation which when combined hardens and forms a mass, which it is claimed can be made as hard as stone or as elastic and pliable as hard wood. As a flooring the material is put down in plastic shape in a way to make a continuous, jointless surface, and when continued around the walls in the shape of a baseboard to a hight of 6 in., gives a floor surface that is sanitary, dustless and fireproof. Large surfaces can be laid off in squares by using colored material for borders. The entire mass of the floor surface can be furnished in a color to match the woodwork or other trim of a room so as to harmonize with the surroundings. The claim is made that the floor is neither noisy to walk upon nor hard and rigid like cement and tile floors. The material used acts as a deadener of sound to the rooms below, and for these reasons the floor is of great advantage in hospitals, schools, bathrooms, kitchens, and in fact, in almost every place where it is desirous to have a dustless, sanitary, fireproof floor surface. The point is made that when the material is to be laid on a concrete subfloor the concrete should be floated to a level surface and perfectly hard, so that it will not scale off or crumble under foot. When it is to be laid on wood the lumber should be thoroughly seasoned and the boards, not more than 6 in. wide, should be securely nailed, the rough side up. It is applied to a thickness of ½ in., and the company states that specifications should call for the subflooring to be finished within ½ in. of the proposed floor level. For wainscoting Monolith is made in the form of slabs of any size, thickness or shape, so as to fit the wall space. These slabs are secured to the wall either by screws or by being cemented with the same material. The

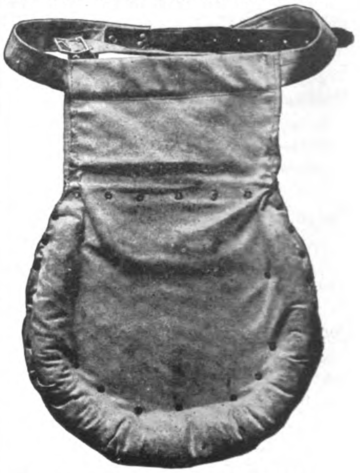
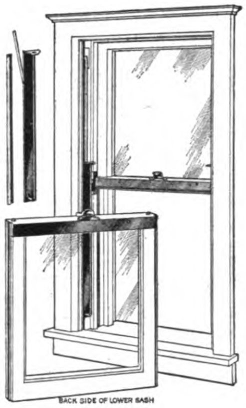


Fig. 4.—Antislipping Roofing Saddle.

colors which can be produced are terra cotta, cream, black, slate, buff and straw. Special attention is called to the fact that this wainscoting, in connection with the flooring, is an excellent material with which to remodel kitchens and bathrooms in old buildings. An interesting pamphlet which the company has issued shows the manner in which the work is done, as well as buildings having Monolith floors. There is also a report of Professor Norton regarding a series of tests of Monolith flooring made at the Massachusetts Institute of Technology, together with a list of some of the patrons of the company.



Novelties.—Peerless Detachable Sash Support and Weather Strip.—Fig. 5.—Lower Sash Reversed, Showing Weather Strip and Spring Buttons.

Peerless Detachable Sash Support and Weather Strip.

An attachment for a window by which, without the use of tools, the sash may be removed for washing, while also forming a weather strip for keeping out cold winds and dust, is illustrated in the accompanying cuts. The device may be used on any window having the ordinary weights or sash balances and requires only a slight change in construction. In Fig. 5 a window is shown with the lower sash removed and turned about, showing the weather strip at the sides and meeting rail, and the spring buttons in the top. The weights, or balances, are not attached to the sash, but to the metal supporting strip which fits over the edge of the sash. A short pin projects from the bottom end of this strip upon which the sash rests, a small pocket being bored in the lower edge to receive it, and the upper end of the strip is bent over the top of the sash, allowing the spring button to project upward through the hole in the end of the strip. When the sash is released by pressing upon the spring buttons the metal strip is automatically locked down by the spring shown in the parting strip just below the top sash, thus holding the weights in position until the sash is replaced. At the left side of the illustration is shown the sash supporting strip with sash cord attached, and also a section of the holding strip in which the sash supporting strip slides. Fig. 6 shows the lower sash removed entirely and the upper sash drawn down and partially removed. The sash may be sustained in this position while being washed, if desired, instead of being taken entirely out. The cross section, Fig. 7, shows the form in which the metal parts are bent to form a thoroughly windproof window. At the left hand side a window stop is shown, which may or may not be used, as desired. The stop is so made that it can be instantly removed with the hands without loosening any screws or nails. The device is referred to as particularly valuable for use in high buildings, as it entirely obviates the necessity of standing on the outside of the window when washing the glass. The device is being put on the market by the Hardware Supply Company, Grand Rapids, Mich.

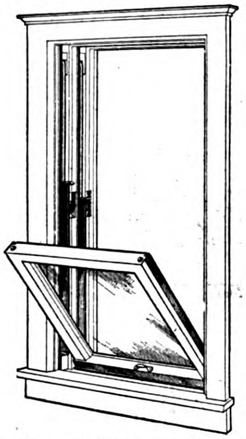
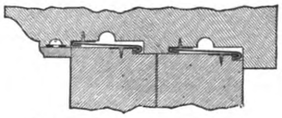


Fig. 6.—Lower Sash Removed Entirely and Upper Sash Drawn Down and Partially Removed.



Lower Sash. Upper Sash.

Fig. 7.—Cross Section Showing Form of Bent Metal Parts.

Grammes' Circular Saw Vise.

A vise which is said to be adapted for all kinds of circular saw and cutter filing, irrespective of the kind of teeth, is the tool which is illustrated in Figs. 8 and 9 of the engravings, and which is manufactured and placed upon the market by L. F. Grammes & Sons, 12 South Hall street, Allentown, Pa. The vise is referred to as being very compact and as having no heavy jaws or protruding levers or bolt heads to spoil the filer's stroke. The jaws are thin but strong, and hold the cutter or saw at both teeth and collar at the same time, thus preventing all vibration. The vise is constructed of iron and has such few parts that there is nothing to get out of order. It is easily fastened to a table or bench by simply boring one hole to admit the fastening bolt. One of the srrong points of the vise and one which cannot fail to be appreciated is that the tool can be adjusted to any position desired. When a miter tooth saw is to be filed it can be swung in a slanting position, as shown in the illustration, or directly horizontal, according to the requirements of the filer. When a straight tooth saw or cutter is to be filed it can be swung into a vertical position. The vise is meeting with a very gratifying reception at the hands of the trade, a fact which has been demonstrated by the course adopted by the manufacturers of placing the tool with interested parties on 30 days' trial, with the understanding that it was to be returned at the end of that time if not found to be worth double the price asked for it. If the mechanic is unable to obtain the vise from the local dealer he can secure it direct from the manufacturers, the understanding being that it may return at the end of 30 days if not entirely satisfactory.

Gramme's Circular Saw Vise.—Fig. 8.—Saw in Position for Filing.

Taylor's Brand of Roofing Tin.

The N. & G. Taylor Company, Philadelphia, Pa., has made an important change in the name of its leading brand of roofing tin. This brand has been known in recent years as Taylor Old Style. Hereafter it will be known as the Target and Arrow Old Style, which is the name used many years ago. The change is a return to the old time designation for the tin as the plates have always been distinguished by the registered trademark of the target and arrow stamped on the sheets. The trademark for the brand therefore remains the same as formerly. The roofing tin on which this stamp appears is exactly the same old time durable quality which the Taylor Company has been selling for more than 60 years and represents the kind of tin plate which it furnished and is still to be found in good condition on roofs in the older cities in this country after 50 and 60 years' wear. The high standard for materials and manufacture established in the early days of the business is still maintained in this heavily coated hand-made plate. It is a significant fact that this tin had already made a record for long-time service before any other brands now on the market were offered for use.

Fig. 9.—Tilted Position of the Vise.

Electric Miter Saw.

A device which is likely to be appreciated in woodworking establishments is the Electric Miter saw recently introduced to the trade by W. C. Kantner, 103 South Sixth street, Reading, Pa. The device consists of a circular saw suspended from a roller bearing wheel and connected to a motor by a belt with a reciprocating and oscillating shaft. It is operated with the foot, thus leaving both hands

free to attend to the changes of miter and the sawing. An automatic safety guard hides the teeth of the saw except at the cutting point. The machine operates on a 2-ft. square iron table and the motor is of 1 hp., of either direct or alternating current. The saw is 12 in. in diameter, hollow ground, and the claim is made that it needs no setting. The gauge is so constructed that it can be set for both the long and the short end of the frame at the same time. It cuts molding as smoothly as if planed, and has a capacity ranging from the smallest up to as much as 12 in. Any angle can be accurately sawed, as well as stair balusters, curtain poles, shade rollers and other articles requiring accuracy and fine finish.

Novelties.—Yankee Spiral Ratchet Screw Driver No. 35—Fig. 10.—View of Tool with Bits.

Yankee Spiral Ratchet Screw Drive No. 35.

The latest addition to the line of "Yankee" tools which have become so popular in the trade is the No. 35 Spiral Ratchet Screw Driver, with attachments, illustrated in the accompanying engravings. It is intended especially for the use of carpenters, electrical workers, cabinet makers and mechanics having a large number of small screws to drive and where a lighter weight tool will be much more sensitive and convenient than the standard pattern, or No. 30. As the tool measures only 7 in. in length when closed and weighs complete less than 7 oz., it is small enough to be conveniently carried in the pocket. It drives screws in or out, ratchets in or out, and is arranged to hold rigid when closed or extended. A general view of the tool with bits is shown in Fig. 10, while in Fig. 11 is shown the chuck with drill point, also the countersink which can be furnished when desired. The bits are straight, so that they can be used to drive screws through holes in insulators, &c., where the flattened blades will not pass through holes. The length of the tool, with bit in chuck, is 9¼ in. closed and 12½ in. when extended. Extra long bits projecting 4 in. beyond the chuck or 2 in. longer than the regular bits can be furnished in the widths indicated. The tool is made by North Brothers Mfg. Company, Philadelphia, Pa., who point out that the great convenience of the new screw driver in its smaller size and lesser weight renders it a desirable tool even to those mechanics who already have No. 30. The tool operates both right and left hand as well as rigid.

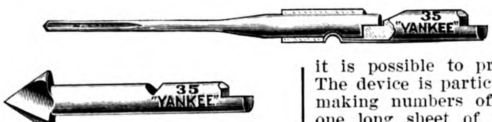
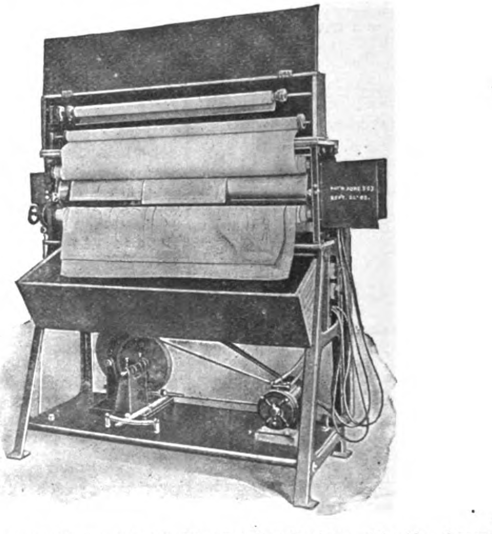


Fig. 11.—Chuck with Drill Point; Also Countersink.

The Everett-McAdam Blue Print Machine.

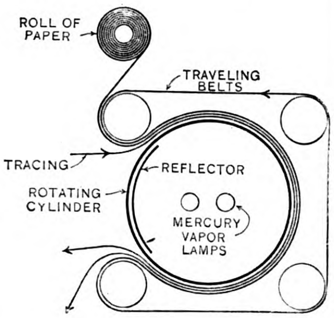
Many features of decided advantage appear to be embodied in the Everett-McAdam continuous electric blue printing machine illustrated in Fig. 12 of the engravings and manufactured by the Revolute Machine Company, 523 West Forty-fifth street, New York City. In connection with Fig. 13, which is a cross sectional diagram through the part which is involved in the actual work of printing, the following description, taken from a circular issued by the company, will make clear the principle:

"The machine consists of a rotating glass cylinder which lies in a series of narrow belts and within which cylinder are placed two mercury vapor electric lamps. The roll of paper to be printed is placed in a box on top of the machine and feeds in continuously between the belts and the cylinder; or, if only a few prints are wanted, previously cut sheets of paper may be fed in. The tracings are inserted between the paper and cylinder, and after passing around three-fourths of the circumference of the cylinder are deposited with the paper in a box in the front part of the machine, the printing being done from the inside of the cylinder as the paper and tracings travel around it. This machine successfully accomplishes continuous blue printing by electric light and is capable of making prints 5 ft. wide and of any length in which it is possible to procure the paper. The device is particularly adapted to making numbers of small prints on one long sheet of paper or on cut sheets, and all will be of an absolutely uniform tone. One special advantage of this continuous machine is that it is only necessary to handle one tracing at a time, the small ones being fed in side by side, one after the other, while the paper feeds in automatically from a continuous roll. The tracings go in and come out on the same side of the machine, so that the leading edge of a tracing may be fed into the machine before the trailing edge comes out, saving considerable time where more than one print is wanted from one tracing. This was very nicely illustrated by making 12 prints from one 6-ft. tracing on a single sheet of paper 72 ft. long without wasting an inch of paper or a second of time between prints. The use of a number of 1¼-in. belts, instead of a single broad one, for holding the paper and tracings in contact with the glass cylinder gives absolutely perfect contact, so that there can be no spots where the printing is not sharp. The lamps used are particularly adapted to this kind of work, as they give out only chemical rays, no energy being lost in nonchemical light, and as the printing is done from the inside of the cylinder the light strikes the paper at right angles and the machine has an absolutely maximum electrical efficiency. A reflector on that part of the cylinder uncovered by the paper in process of printing serves the double purpose of preventing light from striking the paper before it enters between the belts and cylinder, and returns the rays of light, which would otherwise be wasted, at at least half their intensity. The machine is very compact, requiring a space only 2 x 5 ft., and is entirely self-contained. Very little power is required for the drive, which is afforded by a motor on the base of the machine. The motor runs at a constant speed, but through a variator the speed of the cylinder can be instantly changed to any rate desired by moving a convenient lever. The speed variator is a simple device consisting of two disks set side by side, one behind the other, with a movable roller between. The driving disk is belted to the motor and runs at constant speed; the driven disk is belted to a shaft carrying a worm, which meshes with a



The Everett-McAdam Continuous Electric Blue Printing Machine.—Fig. 12.—General View of the Machine.

worm wheel on the shaft of the lower front one of the four rolls which carry the belts surrounding the cylinder. When the roller between the friction disks is moved toward the center of the driving disk it is also moved away from the center of the driven disk and the speed of the cylinder is retarded. The opposite movement of the roller accelerates the cylinder. To avoid stopping the motor when the cylinder is to be stopped temporarily the worm driving the lower front roll is arranged so that it may be retracted from the worm wheel by stepping on a foot button near the front of the machine. This leaves all of the rolls free, and a tracing started crooked or creased may be easily withdrawn and re-entered.



Novelties.—Fig. 13.—Detail Showing the Course of the Taper and Tracing.

Kingston's Ladder Bracket.

A steel adjustable folding ladder bracket for the use of carpenters, painters, tinsmiths, plumbers and in fact every mechanic having occasion to require the use of temporary scaffolding or staging has just been placed on the market by the Kingston-Hall Company, 550 Franklin street, Cambridge, Mass. The bracket is of such a nature that its use effects a great saving of time, material and cost, while coincidently it avoids the necessity of erecting a pole staging on the side of a building. These brackets are made of 1¼-in. angle steel, and the claim is made that they can be placed on a ladder ready for use in two minutes. A general idea of the application of the bracket may be readily gathered from an inspection of Fig. 14 of the accompanying illustrations, in which two ladders are shown leaning against the side of a house. When not in use the bracket is folded, so as to occupy a very small space, as indicated in the engraving. One of the very strong features of this bracket is that the bearing is close to the rail of the ladder, thus assuring safety, which is the greatest essential in a ladder bracket. The brackets can be adjusted to either the outside or the inside of the ladder, thus allowing the workman to get close to the eaves of a roof or to the wall lower down. When used in conjunction with the roof staging bracket manufactured by the same concern, work of practically any nature can be done on the outside of a house or on a roof, thus doing away with the necessity of pole staging. The claim is made that they can both be put up and in use in the time usually consumed in taking the stock off the wagon for a pole staging. The devices are referred to as labor, money and time savers in the fullest sense of the word.

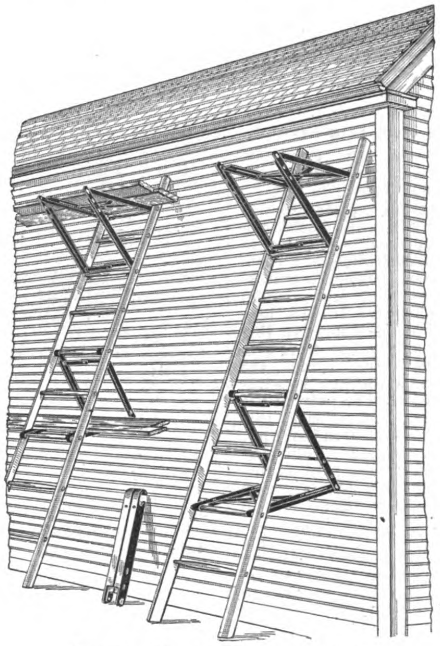


Fig. 14.—Kingston's Ladder Bracket.

The Norka Tubular Frame Grindstone.

The grindstone frame shown in Fig. 15 of the accompanying cut is made of heavy tubing, 1 in. in diameter, strongly braced, so that it will not tip over either backward or sideways and stand firmly while in service. The frames are painted in blue and black. The stones are of selected grit and run on antifriction bearings, while the boxes containing the bearings are heavy and strong. For shipping the stones are crated to prevent breakage and to insure the lowest freight rate. It requires about 10 minutes to set up the frame and stone from the crate. The goods are being put on the market by the Whitman & Barnes Mfg. Company, Chicago, Ill.

Blank Forms for Estimating.

An improved blank form for estimating has been drawn up by the McCrum-Howell Company, 46 East Twentieth street, New York City. The blank form is ruled and lettered in accordance with an up to date method of figuring steam and hot water heating contracts. It has been prepared for distribution in the steam and hot water fitting trade and, it is understood, will be supplied free to steam fitters regularly in the business, the only requirement being that application must be made to the company, although the requests can be made either of the New York office or of any of the branch offices, which are located in Boston, Philadelphia, Pittsburgh, Scranton, Chicago and Cincinnati.

On one page of the blank, which, it may be stated, can be folded to take the size generally characteristic of folded legal papers or specifications, are spaces for setting down the dimensions of the heating system and on the facing page is a blank tabulation for recording the estimate. The dimension page allows space for some 38 rooms and is arranged for calculating the cubical contents and for recording the exposed glass wall, the exposed wall surface, the amount and style of the radiation, and so on for each room. Blanks are provided for stating general facts like the material of construction, kind of fuel to be used, depth of cellar and size of smokestack. The page for the estimate includes the radiation, valves and other fittings, and equipment, besides labor and freight charges. The McCrum-Howell Company manufactures, it will be recalled, the Richmond boilers and furnaces, the Uniontown radiators and the Penn enameled ware.

Growth of the Correspondence School Idea.

Some remarkable figures have been given out concerning the extent of the work of the International Correspondence Schools, Scranton, Pa. The fifteenth anniversary of the founding of these schools was celebrated on October 16, and the history of the movement was reviewed in an address by the president, Thomas J.

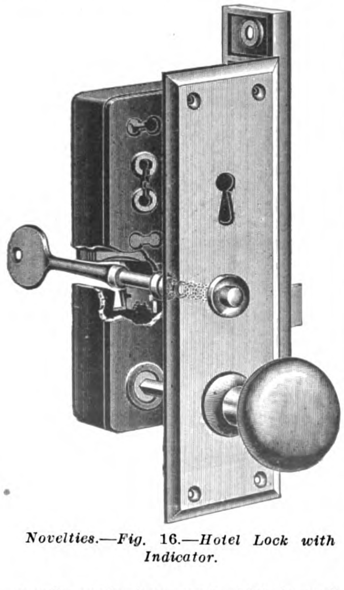
Fig. 15.—The Norka Tubular Frame Grindstone.

Foster. The total enrollment in the schools has reached about 930,000. Up to the latter part of last year 90,000 pupils had either received diplomas or completed advance study in the courses for which they were enrolled. In addition 250,000 pupils had completed elementary work in mathematics, drawing or other preliminary studies. In 1905 the total number of recitations or other student work sent into the schools and corrected by instructors was 732,069; the number of special instruction letters written was 109,680. The operating force in all departments is 2800 and the buildings at Scranton represent an investment of over $500,000.

Hotel Lock with Indicator.

Russell & Erwin Mfg. Company, New Britain, Conn., is offering the hotel lock No. 607, shown in Fig. 16 of the accompanying engravings. It is furnished with a push button indicator, which makes it possible to tell from the outside whether a room is occupied or not. The illustration shows the outside knob and escutcheon with key inserted in the lock from the inside of the door. In this position the end of the key stem prevents pushing back the button. On the contrary, when the key is withdrawn there is nothing to prevent the button from being pushed back, this fact indicating to the attendant that the room is unoccupied. Following out the same idea the company is furnishing revolving disc indicators with locks operated by keys inside as well as those operated by turn knob from the outside. This disc, revolving with the key or turn knob, indicates whether or not a room is occupied by presenting plain or capped surfaces in the face of the outside escutcheon.

Defiance Combination Saw Table.



Novelties.—Fig. 16.—Hotel Lock with Indicator.

A machine which is especially adapted to meet the requirements of small repair shops, and which is made either with or without boring attachment, is the new Defiance Combination Saw Table No. 5 turned out by the Sidney Tool Company, Sidney, Ohio, and illustrated in general view in Fig. 17 of the engravings. The table measures 31 x 38 in. in size, has both up and down and side tilting adjustments, together with extended arbor for dado head and boring attachment. By this means the operator is enabled to do any kind of grooving, dadoing or bevel cutting. The arbor carries a saw blade up to 14 in., and is turned down to 1 in. at the point where the saw goes on. The diameter of the tight and loose pulleys is 8 in. with 4-in. face, while the drive pulley is 16 in. in diameter, with the same width of face. The machine weighs about 750 lb., and the speed of the countershaft ranges from 500 to 600 rev. per min.

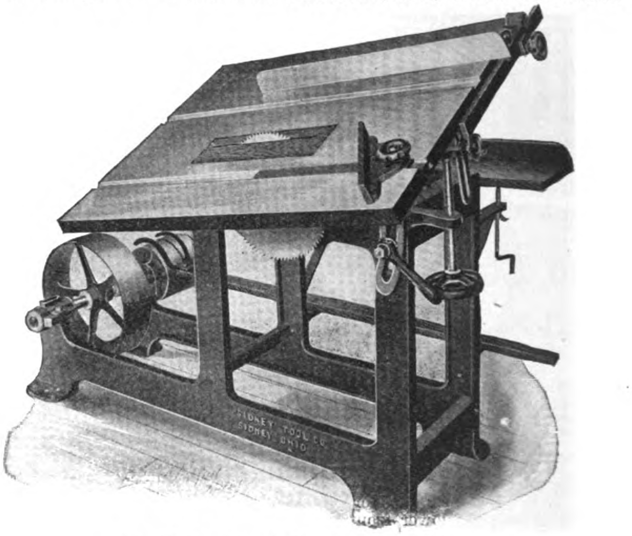


Fig. 17.—Defiance Combination Saw Table.

TRADE NOTES.

Max L. Keith, 521 Lumber Exchange, Minneapolis, Minn., presents in our advertising pages this month an announcement which is likely to interest carpenters, contractors and building mechanics generally. There is a special offer in connection with the announcement, and those who are interested can secure complete descriptive particulars by making application to the address given.

The Essig Pivot Window Company, 541 Wood street, corner of Sixth avenue, Pittsburgh, Pa., has issued a neat little pamphlet of a size convenient to carry in the pocket, setting forth the merits of the fixtures manufactured for vertical and horizontal pivot windows. Through the use of these fixtures the sash may be readily turned or reversed, so that a window can be easily cleaned from within the room, thus avoiding many of the dangers incident to cleaning from the outside. This is a feature to be especially appreciated by those doing this kind of work in tall office buildings and business blocks where they often risk their lives while cleaning the windows. The devices referred to in the little pamphlet are suitable for different kinds of windows in general use and which can be so operated, it is claimed, that cleaning windows will cease to be a dangerous occupation.

Those of our readers who give employment to labor will be interested in the announcement presented in our advertising pages this month by the Maryland Casualty Company, Baltimore, Md. It relates to Employers' Liability Insurance, and calls attention to the policy issued by the company and to some of the leading features covered by it. The financial standing of the company is given as well as a list of some of the other lines for which insurance is issued. A booklet has been issued giving full information relative to the subject of Liability Insurance, and those who are interested can secure a copy on application to the company.

The Imboden Harrow & Roller Company, Cleona, Lebanon County, Pa., is offering the trade a brace chuck which is claimed to fit any bit brace. The point is made that it is something every mechanic requires, and that it will hold anything measuring from ½ in. down. Every tool is guaranteed, and the company shows in its advertising space this month a sectional view clearly indicating the construction employed. Those who are interested can obtain descriptive circular, prices, &c., by addressing the manufacturer.

Christmas is near at hand and people generally are turning their thoughts to gifts suitable to the occasion. It is a time when many are perplexed as to the sort of gift to procure for their friends, and it is possibly with a view to affording all such a gentle hint that the Caldwell Mfg. Company, 3 Jones street, Rochester, N. Y., directs attention in its advertisement this month to the Boucher adjustable shaving glass, which is referred to as "a rare Christmas gift." It has a bevel and chipped edge and is of such a nature the company suggests that every man should have one. A circular relating to it can be obtained on application to the address above given.

J. D. Bee, Jr., 88 West Neptune street, West Lynn, Mass., directs attention in his advertising space this month to the Bee Easy skylight lifts, which he manufactures and the leading features of which are covered by letters patent. The lift is operated with or without a cord, and is referred to as being strong, durable and inexpensive.

A charter has just been granted to the S. & W. H. Northrop Lumber Company, which is to have its financial office in Richmond, Va., although its operating office and yards, wharf, &c., will be located at Wilmington, N. C. S. M. Woodward is president; S. T. Pleasants, secretary; James L. Robertson, treasurer, and Samuel Northrop, general manager. Mr. Robertson with Mr. Northrop will be in charge of the business, which is to succeed to the lumber export business heretofore conducted by the well-known concern of S. & W. H. Northrop of Wilmington.

The Ideal Concrete Machinery Company, South Bend, Ind., lately secured a large order for Ideal concrete block machines from an Eastern concern dealing extensively in concrete machine and construction supplies. We understand that the company is also doing an extensive foreign business and that its machines are meeting with constantly growing favor.

The Bostrom-Brady Mfg. Company, Atlanta, Ga., is having a lively demand for the Bostrom improved farm and builders' levels, not only from the different States, but also from foreign countries. In addition to manufacturing levels, the company is open to make estimates on the manufacture for others of mechanical specialties in brass and steel.

We have received from the Co-operative Electrical Development Association, 1814 Forty-fifth street, N. E., Cleveland, Ohio, a copy of a booklet entitled "Applications of Electricity," showing its use for light, heat and power in different lines of business. This it is stated is the first time in the electrical trades that a comprehensive table of applications of electricity has ever been prepared, and in the little work 508 distinct applications of current are tabulated. The association is unique in standing for the commercial advancement of electrical business along co-operative lines, and much that is interesting bearing on the subject is found in a paper by J. Robert Crouse, read before the June meeting at Atlantic City of the National Electric Light Association.

Fill Those Cracks

with

Johnson's Crack Filler

Send Coupon Below for FREE Sample Can

Photographic illustration showing ease of applying Johnson's Crack Filler.

"A Non-Shrinking Adhesive Compound for Filling Cracks."

It has taken us years to perfect Johnson's Crack Filler, which is now recognized as superior to all substitutes for putty. Expert painters and wood-finishers are using it in preference to any other. It is of special value in filling cracks between boards, nail and carpet tack holes in old floors. It is also used for rough and slivered surfaces; it will not shrink, is antiseptic and moth preventive

Johnson's Crack Filler is Sold by all Dealers in Paint

1 and 2 lb. cans, per lb., 25c. 5 lb. cans, per lb., 20c.

Ask your dealer and insist on getting the genuine Johnson's Crack Filler.

Mail us coupon to the right and get **FREE** sample can of Johnson's Crack Filler and copy of our new 48-page color book "The Proper Treatment for Floors, Woodwork and Furniture," regular 25c. edition **FREE.** This book is full of valuable information for painters. Send to-day, and mention edition C. B. 12.

S. C. Johnson & Son

Racine, Wis.

"The Wood-Finishing Authorities."

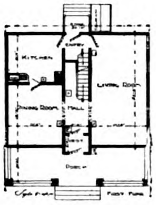
**Coupon
CB12
S. C. Johnson & Son,
Racine, Wis.**

Gentlemen: My paint dealer's name is
______
______

His address is
______
______

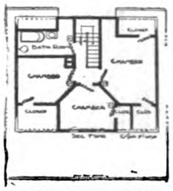
for which please send me FREE prepaid sample can of Johnson's Crack Filler and copy of your new illustrated 48-page color book, "The Proper Treatment for Floors, Woodwork and Furniture," reg. 25c. edition free.

My name is ______
______
Address ______
______



First Floor Plan

Photograph of Plan No. 1 as actually built



Second Floor Plan

I WILL SEND 18 COMPLETE SETS OF WORKING PLANS TO ANY SUBSCRIBER

THESE plans consist of artistic, up-to-date designs for 18 Cottages, Homes and Stores, ranging in cost-to-build from $1,800 to $3,000. Each plan is totally different and includes not only all necessary exterior views, floor plans and working drawings (all on a ¼ inch scale) but also a large Photographic Illustration of each building. *Itemized bills of material showing actual cost of all work including plumbing, heating, painting, hardware, mill work, and all other necessary building materials* are also furnished for each plan.

The first plan (see illustration) is of an artistic cottage 30x26 ground measurement, and is designed with the popular Gable Dip Roof. It has been built a number of times for approximately $2,200—just the kind and priced house that the average home builder wants.

The .plans cost subscribers absolutely nothing (and this is the only way they can be secured) as they will appear in the

Journal of Modern Construction

my new technical monthly magazine for Contractors, Builders, Carpenters and dealers in building materials. They will not only enable any Carpenter or Builder to meet any legitimate local competition on "designs," but in 9 cases out of 10 *he can also land the contract because he can estimate so accurately.*

Besides one or two of these Plans, each issue also contains from 48 to 56 pages, 9x12, well printed and profusely illustrated, of which about 20 pages are devoted to *Special Articles by recognized authorities,* on New Building Materials, New Methods of Construction and other Timely Subjects.

Each issue also contains Regular Departments covering general Building News, The Cement User, Heating, Plumbing, Price of Building Materials, the Painter and Finisher, Good Books on Construction, Correspondence, Questions and Answers and a department of Advertising Criticism.

During 1907, beginning with the January number, there will also appear, a continued article on "Advertising Building Materials," specially contributed by Stanley L. Wilcox, the well known specialist in this field.

This feature will be of great interest and value to all Dealers and Manufacturers of building materials and supplies, as well as to all progressive Builders and Contractors.

Yearly subscriptions, $2.00. Special terms to Local Agents, Clubs, etc. Single copies 20 cents each at all news stands.

SPECIAL OFFER

AS a special inducement to the readers of Carpentry and Building send me $2 for a year's subscription, beginning with the January issue, *on the distinct understanding that your money will be instantly refunded if after 2 issues, you are not satisfied,* or if you feel that my magazine is not *exactly as represented.* By this offer the publication must sell entirely upon its own merits, and as I am a responsible publisher, *you take absolutely no risk whatsoever.*

Or, if you prefer, write me and I will send you the complete Descriptive Prospectus for 1907 and Advance Illustrations of 10 of the 18 complete working plans which will be published during 1907.

I will also send you full details of our special proposition and terms to Local Subscription Agents if you are interested. Write me immediately—now, before you turn this page—The sooner you subscribe the sooner I believe you start towards a bigger business and bigger profits.

521 Lumber Exchange Max L. Keith **Minneapolis, Minn.**

Note:—As the publisher for many years of the well known Keith's Magazine on Home Building, Mr. Max L. Keith, hardly needs any introduction to the readers of this publication and his great success in publishing Keith's Magazine is the strongest possible guarantee that the JOURNAL OF MODERN CONSTRUCTION will be equally good and successful.

We Want Every Carpenter an
Builder to Try Our Columns

If Your Dealer Can't Supply You, Write Us.

CATALOG AND SAMPLE SECTION FREE

OUR GUARANTEE

Our columns are absolutely perfect in architectural proportion, mechanical construction and material. They will not open at the joints, check or wrap. They are sold with the distinct understanding that if not satisfactory in every way they are returnable at our expense. You take no risk whatever.

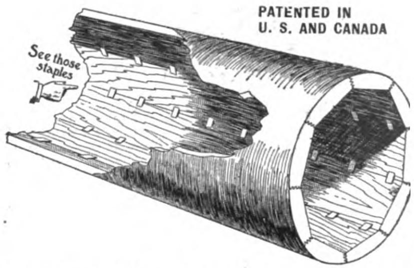
THE PRICE?

NO MORE THAN YOU PAY FOR THE CHEAP GLUED UP KIND

5000 ASSORTED SIZES IN STOCK ALL THE TIME.

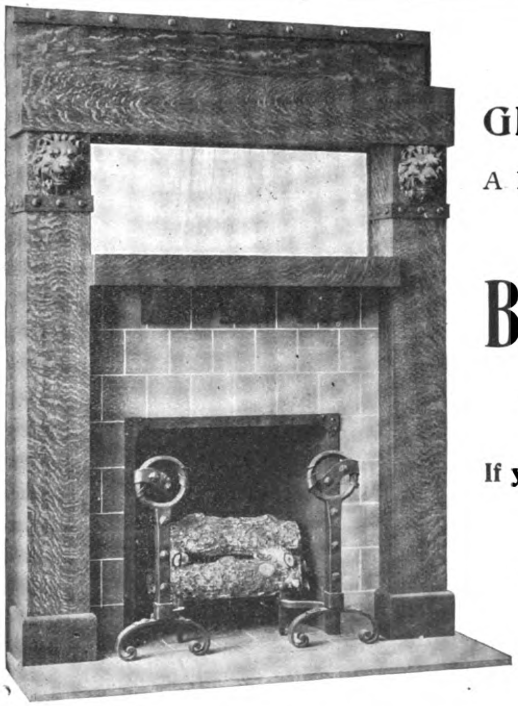
ORDERS FILLED SAME DAY RECEIVED. NO DELAYS.

Made Only By
American Column Co.,
Battle Creek, Mich.



Don't Take Substitutes

You Don't Have to—Insist On The Staple-Locked



WHY NOT

GIVE YOUR CUSTOMER

A little greater satisfaction and at the same time save yourself a few dollars by ordering a

BURRITT MANTEL

They please others—we're sure they'll please you

If you need FIRE PLACE GOODS, send for Catalogue "C"

COAL GAS **GRATES** AND IRON FENDERS

In fact everything required for that fire place.

TILES AND TILE WORK OF EVERY DESCRIPTION

If we can save you money, you want to know it, don't you?

THE A. W. BURRITT CO.
"THE MANTEL FOLKS."

400 KNOWLTON STREET,
BRIDGEPORT, CONN.

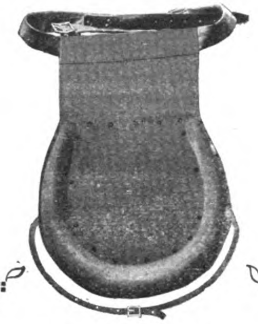
Wood Carvings

Hand and Machine Carvings, Mouldings, Festoons, Newel Posts, Head Blocks, Rope and Twist Balusters and Ornaments. We also make a specialty of Fine Staved Up Quartered Oak and Birch Columns for Interior Work.

Almost 1,500 designs illustrated in our New Catalogue and Price-List No. 20. Mailed for 15c. in stamps.

Waddell Mfg. Co.,
Corner Taylor and Coldbrook Sts.,
GRAND RAPIDS, MICH., U. S. A.

No. 0575.



STOWE'S

Shingling Kit

For Carpenters and Builders.

Anti-Slipping Roof Saddle

$1.50 each

Anti-Slipping Shingle Bracket

25c. each, $3.00 per doz.

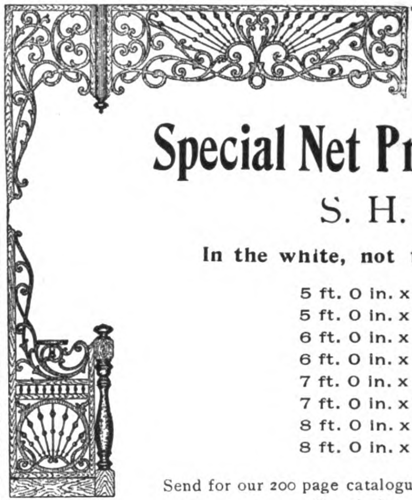
Anti-Slipping Sandals

Per pair, $2.00

Sold by leading jobbers and hardware dealers. If your dealer will not supply you with them send direct to us with money order and we will send them to you prepaid.

Coldwater Specialty Mfg. Co.
COLDWATER, MICH.

Easy Lessons in Roof Measurements. Twelve Short Lessons on Figuring from Architects' Drawings the Amount of Material Required to Cover a Given Surface in Flat, Hipped or Irregular Shaped Roofs. 31 pages, 12 illustrations ..... .25
For sale by David Williams Co., 14-16 Park Pl. N.Y.



Special Net Prices on Grilles

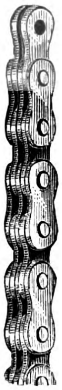
S. H. 1072½

In the white, not filled and varnished.

5 ft. 0 in. x 8 in.,	$9.60
5 ft. 0 in. x 9 in.,	10.00
6 ft. 0 in. x 8 in.,	10.80
6 ft. 0 in. x 9 in.,	11.25
7 ft. 0 in. x 8 in.,	12.00
7 ft. 0 in. x 9 in.,	12.75
8 ft. 0 in. x 8 in.,	13.20
8 ft. 0 in. x 9 in.,	13.75

Send for our 200 page catalogue showing a large assortment of millwork for prompt delivery.

Schaller-Hoerr Company
416-426 Blue Island Ave., Chicago, Ill.



THOMAS MORTON,

169 Elm Street, New York.

Copper Cable, Champion Metal,
Steel Cable, Steel Champion,

SASH CHAINS.

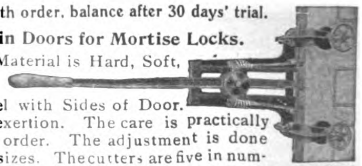
CHAINS

For Suspending Heavy Doors, Gates, etc.
All of SUPERIOR QUALITY.

Miller's Hand Mortiser

PRICE $12.00. $4.00 with order, balance after 30 days' trial.

Its Work is to Make Openings in Doors for Mortise Locks.

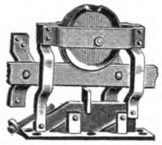


The time is Three Minutes. The Material is Hard, Soft, Cross Grained and End Wood.

The job is Clean, True and Parallel with Sides of Door. The Labor is Performed with slight exertion. The care is practically none, as the tool does not get out of order. The adjustment is done in a moment's time for the different sizes. The cutters are five in number, and cover locks from 1 2 to 1 1-8 inches thick. Thin Doors are handled as easily as Thick Doors.

Riverside, Cal. **A. W. MILLER MFG. CO.** Cincinnati, O.

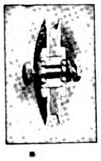
"LANE'S BALL BEARING"
Is the best House Door Hanger made



Has an ALL steel frame.

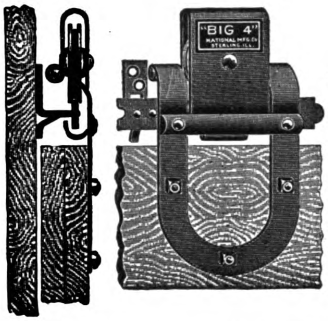
Cups, Cones and Balls are of the same material, made and hardened by similar processes as best bicycle parts.

Sold by the hardware trade. Send for circulars to



LANE BROTHERS CO.,

423-455 Prospect St., - POUGHKEEPSIE, N. Y



"BIG 4" FLEXIBLE DOOR HANGER.

Anti-Friction. Cannot Jump the Track.
Exclusive Sale Given.

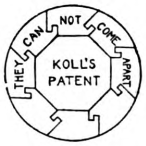
NATIONAL MFG. CO.,
STERLING, ILL.

Grand Rapids Wood Carving Co.,

GRAND RAPIDS MICH.

Catalogue on application.

6—26 in. diam.—
24 ft.-0 in. long.
8—24 in. diam.—
22 ft.-0 in. long.
79—14 in. diam.—
11 ft.-7 in. long.



SHINNECOSSETT INN, NEW LONDON, CONN.
R. W. GIBSON, Architect.

Koll's Patent Lock Joint Columns and Ornamental Capitals were made and furnished by us for this building.

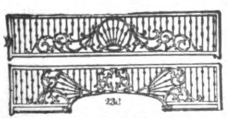
We have unusual facilities for turning out work of this character. See our special catalogue in "Sweet's Indexed catalogue of Building Construction" pages 323 to 328.

HARTMANN BROS. MFG. CO., Mt. Vernon, N.Y., U.S.A.

New York Office 1123 B'way.—Also Henry Sanders Co., cor. Elston & Webster Aves., Chicago, Ill. A. J. Koll Planing Mill Co., Los Angeles, Cal.

SEND FOR CATALOG (D.)

GRILLES "Direct from Factory" MANTELS



No. 225—48x12 inches, **$3.60.** Retail value, $7.00.
No. 230—48x14 inches, with Curtain Pole, **$4.50.** Retail value, $9.00.

Others from $2.50 up. Largest assortment. Division Screens and special Grilles to order.

Tile and Mosaics
for everywhere.
Walls, Floors, etc.

$13.25 buys this solid oak Mantel, 80 in. high. 54 or 60 inches wide, 28 x 16 Mirror. Heavy columns and elaborate capitals Tile facing and hearth with Plated Frame and Club House Grate, $10. extra.

HARDWOOD FLOORS

will last as long as the house. Any carpenter can lay it easier than ordinary flooring. Get our prices.

Write for catalog of Mantels, Grates, Tiles for floors and baths, Slate Laundry Tubs, Grilles, etc. It is free. Or send 10 cents to pay postage on our Art Mantel Catalog. Mantel Outfits from **$12 to $200.**

W. H. OSTENDORF, - - - - - - 2923 N. Broad St., Philadelphia, Pa.

King's Automatic Weather Strip.
Window and Door Stop.

The only perfectly satisfactory weather strip, window and door stop on the market.

Keeps out cold and dust.

Makes a perfectly tight joint.

Windows can be raised and lowered to desired position without the use of fasteners or of weights.

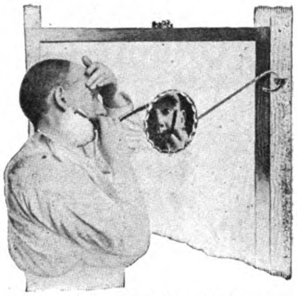
Do not build a house until you have investigated the merits of these strips.

Write for prices.

MANUFACTURED BY
The King Manufacturing Co.
Newton, Ia.

A Rare Christmas Gift
Boucher Adjustable Shaving Glass

EVERY MAN SHOULD HAVE ONE



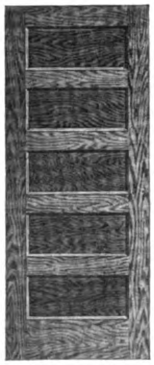
Bevel and Chipped Edge, each $2.00, via express charges prepaid. Send for circular.

CALDWELL MFG. CO.
3 JONES STREET ROCHESTER, N. Y.

50% SAVED

OAK VENEERED DOORS IN STOCK ALL SIZES.

$ $ $ $ $ $ $



$ $ $ $ $ $ $

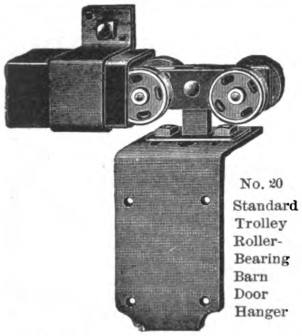
MADE IN STOCK QUANTITIES, SOLD AT STOCK PRICES, CARRIED IN STOCK

THE FOSTER-MUNGER CO.
AMERICAS GREATEST SASH & DOOR HOUSE
CHICAGO, U·S·A·
WRITE FOR VENEERED DOOR BOOK 1448 A

Forest City Bit & Tool Co., Rockford, Ill., U.S.A

Manufacturers of Wood Boring Bits, Hollow Mortising Chisels, Common Mortising Chisels and Tools Send for CATALOG "G" Send for

— ITS DISADVANTAGE.—Shrinking modesty is an attractive trait of character, but it seldom gets a raise of salary.—*Somerville Journal.*



No. 20 Standard Trolley Roller-Bearing Barn Door Hanger

RICHARDS

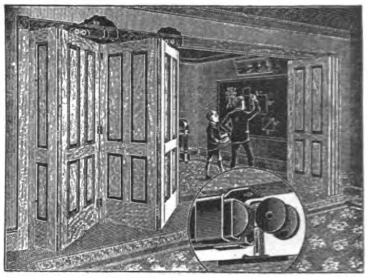
DOOR HANGERS

are the best.

Made for sliding doors of all sizes and weights.

Popular with architects and builders.

Sold by dealers.



No. 135 Ball-Bearing Swivel Door Hanger for folding doors. Vertical Adjustment.

The Richards Mfg. Co., Aurora, Ill.

New York Office, 101 Reade St.

Send for Catalogue of Door Hangers, Fire Door Fixtures, Conveying Systems.

ONE KEY ENOUGH

Did you ever see a man pull out a bunch of keys as big as your fist and try a half dozen which looked alike before he found the proper key? A Yale Master-key Locking System makes one little key open a dozen or a thousand locks of many sizes and uses. The business man may carry one key that will pass every lock in his residence, stable, factory, office, and country place. His wife will have a sub-master key that will open every lock in the home; the superintendent, one that will open any lock in the factory, etc., while each lock has its individual key which will unlock it and no other.

THE YALE DUPLEX Master-Key System

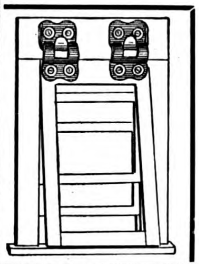
gives all this convenience without reducing the number of key changes and thus lessening the security.

Residences so equipped amply repay in satisfaction the slight additional cost. For factory buildings and public institutions, such as city buildings, school houses, and charitable institutions, the actual savings effected in time, money, tools and supplies is sufficient to return in a very short time the cost of the master-key locking system.

Write for folders explaining the Yale Master-key Locking System, and "The Key to a Good Thing," which shows how a Yale Lock Works.

THE YALE & TOWNE MFG. CO.
9-15 MURRAY STREET,
NEW YORK

YOU CAN MAKE AND SELL MORE



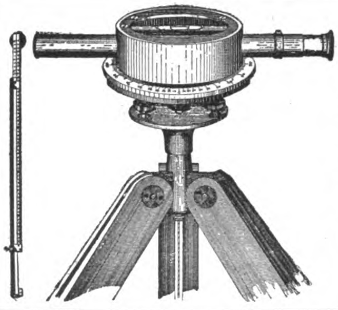
STORM WINDOWS

if you hang them with

GOSSETT DETACHABLE SUSPENSION HINGES

Your customers will be better pleased. Storm sash so attached can be opened for ventilation. Put up, taken down or replaced with screens without the use of ladder or tools. Sample pair free if you mention this paper. Sold by dealers in Hardware and Building Material.

F. D. KEES MFG. CO., Beatrice, Nebr.



WHAT BUILDERS HAVE BEEN LOOKING FOR

BOSTROM'S

Improved Builders' Level

An absolutely reliable leveling instrument for Architects, Builders, Carpenters, and Stone Masons. Can be used for any kind of foundation work and getting angles, is simple in its construction, easily understood, and can be operated by any one. Is made of Brass, oxidized, and has a silvered circle of degrees. Has achromatic Telescope of ample power for such work. Price, including Plumb Bob, Tripod and Graduated Rod and Target, $25.00. Write for circular and be convinced. Every instrument guaranteed.

BOSTROM-BRADY M'F'G CO.,
53½ West Alabama Street,
Atlanta, Ga.

Successful Draftsmanship

taught personally and individually by

Chief Draftsman

of large concern. I guarantee to teach you first-class drafting-room knowledge and experience in a few months' home study. Furnish all tools and high-grade position free when competent. Address

Chief Draftsman, Div. 3,
ENGINEERS' EQUIPMENT CO., Chicago

THE NEW YORK STEEL CORNER PLATE CO.

—SUPPLY—

The Parker Steel Corner Bead for the Protection of Plastered Corners

Outlines a perfect corner. The best Corner Bead in the market. Fits any ground.

Endorsed by Leading Architects, Builders and Plasterers.

Telephone
876 Madison Square.

All communications
to 1135 B'way, N. Y. C.

All phases of Plumbing, Drainage and Water Supply are expertly treated in the new book

Plumbing and House Drainage Problems.

THE SIXTH EDITION REVISED AND ENLARGED.

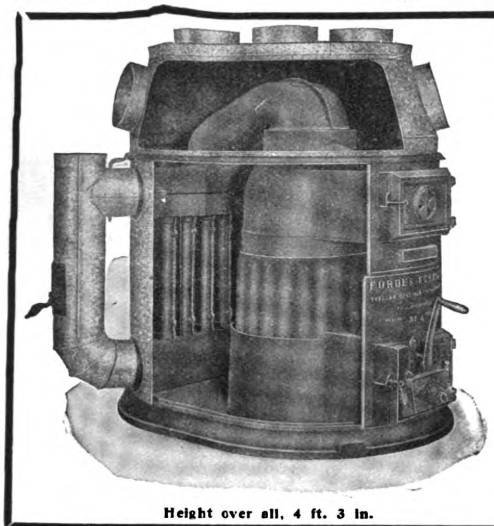
309 Pages, 197 Illustrations. TWO DOLLARS, PREPAID.

DAVID WILLIAMS COMPANY 14-16 Park Place, New York

Digitized by Google

Original from
UNIVERSITY OF MICHIGAN

Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google



Height over all, 4 ft. 3 in.

THE FORBES FURNACE

Burns Either Hard or Soft Coal

EVERY ONE GUARANTEED
IF PROPERLY INSTALLED

No Sheet Iron Drums—Entirely Cast Iron
—Radiating Drums 1-8 Inch Thick,
Will Wear for Years

YOU RUN NO RISK IN PUTTING IN THE FORBES FURNACE

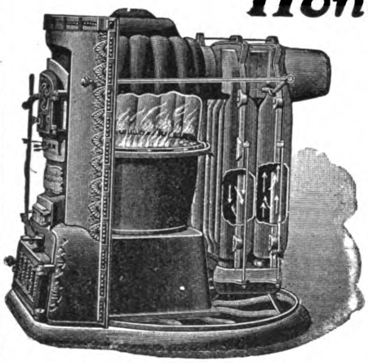
SEND FOR CATALOG AND FULL PARTICULARS

Tubular Heating & Ventilating Co.
228 Quarry St., Philadelphia

Honest Value!

Nothing Light Weight or Frail about the

Bengal Furnace



It's heavy—but well proportioned, and the weight placed where it will give big heating capacity and great durability.

When properly installed you can depend on plenty of pure warm air,—and small coal bills.

Burns hard or soft coal.

If you are looking for an honest Furnace—one you can depend upon—ask for our proposition.

DO IT NOW!

THE FLOYD WELLS CO., Manufacturers, Royersford, Pa.

The Carpenter and Builder who *insists* that the local dealer furnish heating apparatus marked "made by the

INTERNATIONAL HEATER CO.,"

will never be in hot water himself. This "F" series HOT WATER HEATER invariably gives satisfaction.

UTICA, N. Y.
New York. Boston. Chicago.

HARGRAVE'S SPECIAL CLAMPS

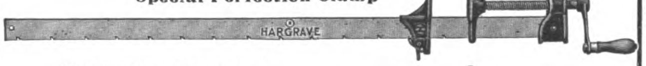
TRADE Ⓗ MARK
HARGRAVE

THE BEST

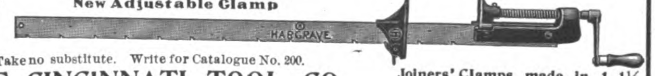
Steel Bars Steel Dogs Notches beneath malleable parts. Take no substitute. Write for Catalogue No. 200.

Special Joiners' Clamp

Special Perfection Clamp



New Adjustable Clamp



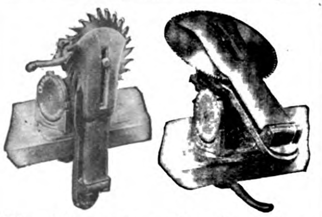
THE CINCINNATI TOOL CO.,
Norwood, Cincinnati, O.

Joiners' Clamps made in 1, 1½ and 2 foot lengths.
Perfection and New Adjustable Clamps in 2 to 10 foot lengths.

LEADER
Steel Furnace $49

Our No. 45 Steel Furnace, without pipes or registers, we send anywhere, freight prepaid east of Omaha, for $49. You can't match it in your town for any such money. It will heat a house of 7 or 8 rooms, store, school or small church. Has steel body with riveted and lined galvanized iron casing. Has brick fire box. Regulated by chains. Burns soft or hard coal, wood or coke. Any man can set it up successfully, putting pipes, registers and smoke pipe in proper positions from our clear detailed descriptions. Don't pay others for what you can do as well yourself. Write for our instructive book, "Modern Furnace Heating," a 40-page book on the science of heating a house. It warns you what to avoid and how to benefit by the mistakes of others. Every house owner should have it. It's valuable. Send for it now. It's free.

Hess Warming & Ventilating Company,
709 Tacoma Building, Chicago, Illinois.



The Grammes Circular Saw Vise Helps You To File Saws Right

It adjusts itself to fit all kinds of circular saws and cutters. No other vise does.

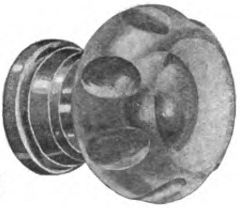
All iron and non jarrable. Saws can't vibrate or spring out of true.

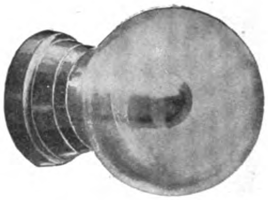
We want to send a vise on THIRTY DAYS TRIAL. You pay us $6.50 if you like it—nothing if you don't like it—just return it. Three sizes.

No. 1 for saws 4 to 9 inches diameter
No. 2 " " 6 to 14½ " "
No. 3 " " 12 to 20 " "

L. F. GRAMMES & SONS
Allentown, Pa.

GLASS KNOBS

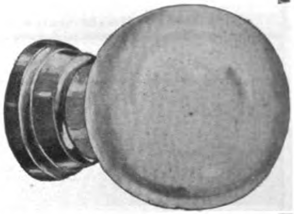




Our Catalogue

shows 64 distinct styles and sizes, in pressed and cut glass, plain and ornamental designs, for doors, drawers, furniture, etc.

Catalogue No. 2085 upon request.



HAMMACHER, SCHLEMMER & CO.

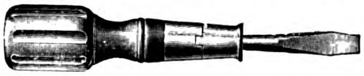
HARDWARE, TOOLS AND SUPPLIES,

NEW YORK, since 1848

Fourth Avenue aud Thirteenth Street (Block South of Union Square)

TOWER'S CHAMPION SCREW DRIVERS

FOR SIXTEEN YEARS THE ACKNOWLEDGED STANDARD.



Every Blade Is Tested to Split a Screw Head.

AVOID Imitations of CHAMPION Screw Drivers. None Genuine without the name "CHAMPION" which is our Trade Mark and Guarantee.

TOWER & LYON CO.

95 Chambers Street, New York.

"Forstner" Brace and Machine Bits

For Fine Carpenter, Cabinet and Pattern Work

Specially Adapted for Hardwood Working.

The Forstner Labor-Saving Auger Bit, unlike other bits is guided by its *Circular Rim* instead of its centre; consequently it will bore any arc of a circle and can be guided in any direction regardless of grain or knots, leaving a true polished surface. It is preferable and more expeditious than chisel, gouge, scroll-saw, or lathe tool combined, for core-boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon moulding and mortising, etc.

To introduce this high grade tool among carpenters, pattern makers, and others, we will mail to any reader of "Carpentry and Building," upon receipt of 50c. any bit we make from ¼ inch to 1 inch in size.

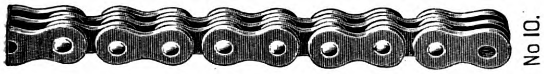
Manufactured by

The Progressive Mfg. Co., Dept. "A", Torrington, Conn.

Enquire of your Hardware Dealers or write us direct. Supplied in Sets. Write for Catalogue.

SASH CHAIN

CABLE CHAIN



JACK CHAIN

The SMITH & EGGE MFG. CO.

Bridgeport, Conn.

Manufacturers of "**Giant Metal**" **Sash Chains**
" " "**Red Metal**" " "

Cable Chains, Jack Chain, Bell Hangers' Chains and Plumbers' Chains
Made in Brass, Copper and Steel

WRITE FOR CATALOGUES AND PRICES

We are the ORIGINATORS of SASH CHAIN as a SUBSTITUTE for sash cord

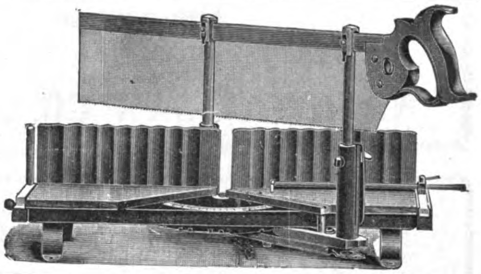
GOODELL MITRE BOX

MADE ENTIRELY OF STEEL. NO MORE BREAKING.
FIRST IN QUALITY AND IMPROVEMENTS.

AUTOMATIC STOPS FOR HOLDING UP SAW.
CORRUGATED BACKS. GRADUATED.
GAUGE FOR DUPLICATE CUTS and many other features.

If you want the best you will take no other.
Send for Circular K.

GOODELL MFG. CO., Greenfield, Mass.

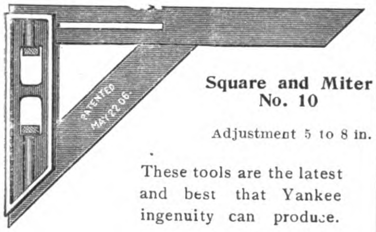


THE AKRON ECLIPSE LEVELS

Manufactured by **The BAKER McMILLEN CO.**
AKRON, OHIO.

We have a proposition that will interest every carpenter Drop us a postal and we will send it to you.

The Fox Tools

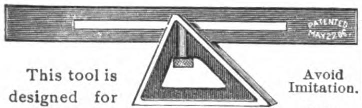


Square and Miter No. 10

Adjustment 5 to 8 in.

These tools are the latest and best that Yankee ingenuity can produce.

Octagon and Miter No. 12



This tool is designed for marking octagons and miter sliding blade will allow of long or short cut.

Avoid Imitation.

None genuine without sliding blade.

The Gem Square and Miter No. 11

Try, miter and gauge square; adjustment 1½ to 8½ inches.

P. L. FOX
Patentee and
Sole Manufacturer of
Fox's Tools
432 WILLIAM ST.
BRIDGEPORT, CONN.

If your dealer won't furnish them write me.

OUR NEW NICHOLLS FRAMING SQUARE

No. 100-A

Has an **Octagon Framing Rule** for framing Octagon roof. It is found on the back of body of square, and on face of body of square is found our **Common Framing Rule.**

NICHOLLS MFG. CO., Ottumwa, Iowa

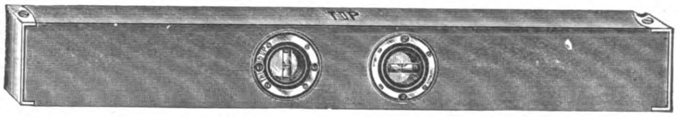
PREVENTS DRAFTS, DUST AND WINDOW RATTLING.

IVES' PATENT
Window Stop Adjuster.

PATENTED.

The only Stop Adjuster made from one piece of metal with solid ribs and heavy bed that will not cup, turn or bend in tightening the screw. Manufactured only by **The H. B. IVES CO., New Haven, Conn., U. S. A.** (Fifty-page Catalogue Mailed Free.)

COOK'S LEVEL



For Carpenters, Machinists, Masons.

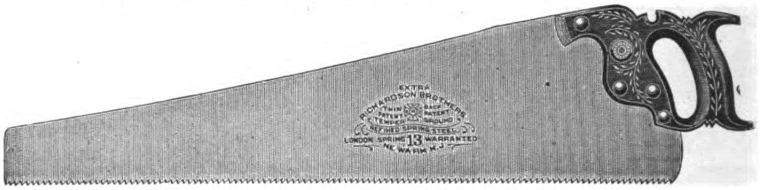
MADE OF WOOD, IRON, ALUMINUM.

Of all Dealers, or Catalogue on Request.

EVERY LEVEL WARRANTED.

DAVIS & COOK, Watertown, N. Y.

OLD RELIABLE RICHARDSON SAWS.



ESTABLISHED 1860.

The peer of them all. Try one and be convinced. Every saw fully warranted.

NATIONAL SAW CO. Operating Richardson Bros. **NEWARK, N. J.**

Quality Tells

WHEN HENRY DISSTON WAS ASKED THE QUESTION: "WHAT DO YOU PUT IN YOUR SAWS?"
HE REPLIED: "GOOD STEEL AND HONEST WORK."

UPON THIS FOUNDATION IS BUILT DISSTON QUALITY.

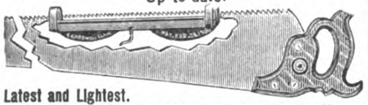
"If you want a saw it is best to get one with a name on it that has a reputation. A man who has made a reputation for his goods knows its value as well as its cost and will maintain it"

ESTABLISHED
1840

HENRY DISSTON & SONS, Inc.
PHILADELPHIA, PA.

C. C. C. SAW CLAMP

Always ready. Easy to Adjust. Never out of order. Up to date.



Latest and Lightest.

Pat. U. S. and Canada 1906. Other Patents Pending.

Can be placed on the edge of bench timber, board or almost anywhere; takes but little room in box; weight, about 1 lb. No carpenter can afford to be without it. **PRICE, 75c.** If your dealer cannot furnish it we will mail postpaid on receipt of price.

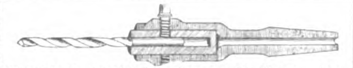
G. W. CARDWELL MFG. CO., - - JAMAICA, N. Y.

When you buy
ECCENTRIC CLAMPS
specify

COLT'S

There is a difference—let us tell you
Ask for catalogue No. 129.

BATAVIA CLAMP CO.,
23 Center Street, BATAVIA, N. Y.



The only Brace Chuck. Fits any bit Brace. Any mechanic wants it. Holds anything from ½-inch down. Sells on sight. Ask your dealer, or us, for circular, price, etc. Every tool guaranteed.

Sole Manufacturers,
The IMBODEN HARROW & ROLLER CO., Inc.
CLEONA, LEBANON CO., PA.

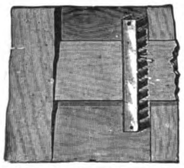
The Chas. A. Strelinger Co.

has become famous the world over for supplying the best of tools, machinery and supplies. This fame has been secured through the world wide introduction of their catalogues—cuts of which appear below—to almost every mill and machine shop everywhere.

If you should be without them—very few now are—send 25c. apiece to

The Chas. A. Strelinger Co.
Detroit, Mich., U. S. A.
Box B.

Digitized by Google
Original from UNIVERSITY OF MICHIGAN
Generated for Dr Marsha Gordon (North Carolina State University) on 2019-11-26 22:15 GMT / http://hdl.handle.net/2027/mdp.39015080123543
Public Domain, Google-digitized / http://www.hathitrust.org/access_use#pd-google



NEW
CLAP-BOARD MARKER.
Cheaper and better than any on the market.

Countersink and Depth Gauge.

Send for circulars, or ask your Hardware Dealer for them.

OTIS A. SMITH, Rockfall, Conn.

"THROUGH FRISCO'S FURNACE" EDITION DE LUXE

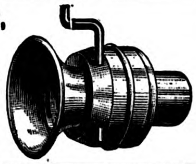
Illustrations of seven modern steel frame buildings at San Francisco, that withstood the earthquakes and fire of April 18th, 1906, with reports on the rust-resisting qualities of Dixon's Silica-Graphite Paint on the steelwork.

WRITE FOR A FREE COPY OF BOOK NO. B-32.

JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, U. S. A.

W. R. OSTRANDER & CO., 22 Dey Street, New York City,

Manufacturers of
Speaking Tubes, Whistles, Elevator,
House and Hotel Annunciators and Bells,
Electric Light Supplies.
Send for Catalogue.



Factory, 1431-1439 DeKalb Avenue, Brooklyn.

"Yankee" Tools.

No. 11.—RATCHET, RIGHT AND LEFT HAND AND RIGID.

No 15—RATCHET, WITH FINGER TURN ON BLADE.

No. 30.—SPIRAL RATCHET, RIGHT AND LEFT HAND AND RIGID.

The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up to date mechanic could buy tools of their quality and character. Other tools are very good tools, but "Yankee" Tools are better. "Yankee" Tools are sold by all leading dealers in Tools and Hardware. Ask your dealer to see them. Our Yankee Tool Book tells all about them. Sent free by

NORTH BROS. MFG. CO., Philadelphia, Pa.

A TOOL THAT'S STAMPED
STANLEY
IS THE BEST OF IT'S KIND

IMPROVED CARPENTERS' TOOLS

Sold by all Hardware Dealers

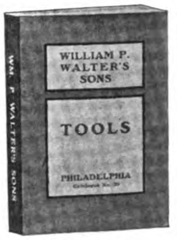
Stanley Rule and Level Co.
NEW BRITAIN, CONN., U. S. A.

A COMPLETE FRAMING RULE
ON
NICHOLLS FRAMING SQUARE.

On the square is where the carpenter wants his figures, not in a book or on a piece of paper, as they are usually lost.

NICHOLLS MFG. CO.,
OTTUMWA, IOWA.

OUR LATEST CATALOGUE
No. 20



Handsomely printed on heavy paper, containing 450 pages, 2000 illustrations, including a full line of

Wood Working and Metal Working Tools, Foot Power Machinery, Lathes, etc.

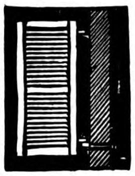
This is the largest and most complete catalogue we have ever issued, being a valuable hand book for any mechanic.

Sent on receipt of 20 cts. postage

WM. P. WALTER'S SONS
TOOL HEADQUARTERS
1233 Market St., Philadelphia

Please mention "Carpentry & Building."

Mallory Shutter Worker.



Works and locks the blinds from the inside. Ornamental, durable, perfect working. Applicable to old or new buildings.

Manufactured by
MALLORY MFG. CO.,
Flemington, N. J.

Use Our
Folding and Adjustable
Handle Draw Knife!

It is adjustable to any position, adaptable to the awkward places, absolutely rigid when set, handy and compact, a time saver and a money earner both to user and dealer, and made of the best cast steel, in five sizes, 6, 7, 8, 9 and 10 inches.

Write for Prices and Discounts.

A. J. WILKINSON & CO.,
180-188 Washington St., Boston, Mass., U.S.A

The Rich Handy Drawing Outfit

Saves Time

for the draughtsman and is a great aid to the learner. It holds a number of sheets or a pad, which requires no fastenings. The Protractor T Square gives accurate angles. You get measurements direct from the board. Has a drawer for instruments, and can be carried around to make drawings on the spot. Circulars free.

J. & G. RICH, 122 N. 6th St., Phila, Pa.

GRINDSTONES

Mounted Grindstones for Carpenters' or Anybody's Use.

THE CLEVELAND STONE CO.
6th Floor, Hickox Bldg., CLEVELAND, O.

THE WILLIAMS PRINTING COMPANY NEW YORK

Send for Catalogue No. 62

Giving description of books on Architecture, Building, Engineering and allied subjects. Sample of "Architects & Builders Magazine" sent on request.

Published monthly at $2.00 a year. Foreign Subscriptions, $3.00 a year,

WM. T. COMSTOCK, Pub., 23 Warren Street, N.Y

CLUSTER REFLECTORS

in a great variety of sizes and shapes for lighting stores, store windows, schools, offices, hospitals, banks, libraries, etc. Made well. Reflect well. Last well.

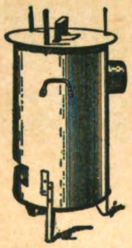
I. P. FRINK, 551 Pearl St.. New York

A 7½ HAND SAW

This is not a PRIZE but a JEWEL. If your dealer can not furnish you one of our CELEBRATED NARROW A 7½ HAND SAW, 6 inch at butt, 1½ inch at point, 4 gauges thin on back, send us P. O. Order for $2.00 and we will send, express prepaid, 26 inch SAW.

C. E. JENNINGS & CO.,
42 Murray Street. NEW YORK.
SOLE MANUFACTURERS.

Plasterers' STOVES



2 Sizes
Send for Price

THE S. M. HOWES CO.
40-46 Union Street, BOSTON

STANDARD FOR OVER 35 YEARS

Our name stamped on every foot is a guarantee that you are getting the best sash cord that can be made.

You've tried the rest
Now buy the best
The best is the cheapest

WIVANCO TOOL CABINETS

Full Size Tools; Best Quality; Fully Warranted and Sharpened Ready for Use

TOOLS, NOT TOYS, $10 TO $25

Also assortment of nails, screws, tacks, screw eyes, etc., in drawer. All cabinets made of polished quartered oak and fitted with brass hinges, cylinder lock, and special brass tool fastenings. *Write for Illustrated Catalogue of Tool Cabinets and Work Benches.*

Save 50% On Your Christmas Presents.

Our Big New Catalogue No. 91 gives prices and illustrations on over 30,000 things that most families need for use or comfort, and is full of Holiday Suggestions from cover to cover. It contains a larger variety of labor-saving, money-saving articles at lower prices than heretofore shown in any catalogue ever published. You will spend hours of interest over its pages. You will marvel at the wonderful variety all complete in one big book. It makes buying pleasant as well as profitable; you cannot afford to be without it. This up-to-date Buyers' Guide costs us $1.00 to print, but we will send it to you postpaid, *free of charge. Write for it to-day.* Buy of us and secure best goods at lowest prices. Prompt shipments, low freight and express rates, and a *square deal* every time. *We sell reliable goods only. We guarantee satisfaction or refund your money.*

White, Van Glahn & Co., 14 Chatham Square, NEW YORK CITY.
Established 1816. The Oldest Mail Order House in America

TAINTOR
Positive Saw Set

Sold by the Trade.

TRY IT If you like it tell others
If you don't like it tell US

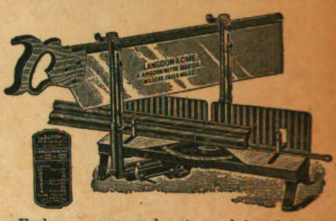
Send for our circular which contains HINTS on the

CARE of SAWS

Free on application.

TAINTOR MFG. CO.
113 Chambers Street, NEW YORK

THE LANGDON ACME MITRE BOX



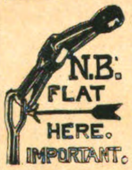
Embraces every advantage claimed for other boxes made, and many that no other box possesses. You should know about them. A circular giving full particulars will be sent to you if asked for.

MILLERS FALLS COMPANY
28 Warren Street, New York

THE FORD AUGER BIT

FORD AUGER BIT CO., Holyoke, Mass.

The first and only Bit with Patented Concave Twist. The best Bit for all round work yet produced. It is worth your time to try one and see.



MONARCH Sash Chain

IS THE BEST.

Samples free. Mention this paper.

The Bridgeport Chain Co.
Bridgeport, Conn.

SAMSON SPOT CORD

Distinguished by our trade-mark, the Colored Spot.

Outwears any other device for hanging windows.

SAMSON CORDAGE WORKS, Boston, Mass.

BURLINGTON VENETIAN BLIND CO.
MAKERS OF
BLINDS
AND SCREENS
BURLINGTON, VT.

L. S. Starrett says:

"If you find any tools better than **STARRETT TOOLS**—buy them."

Send for free Catalogue No. 17 P of the largest line of fine tools made.

The L. S. Starrett Company,
Athol, Mass., U. S. A.